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MONTANA

STATE PUBLIC INVESTMENT PLAN

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June, 1977

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I
Economic Conditions in Montana

EXECUTIVE SUMMARY

An idea of the future direction of Montana's economy is important to decision makers in both government and private business. The purpose of this report is to present a review of the performance of Montana's economy in terms of employment, unemployment, income and population. A series of close looks at each of Montana's major industries is also provided.

* * * * *

Employment growth in Montana during the last 10 years has closely resembled the national pattern. Most of the employment increases have been found in the service and trade related sectors. Employment in the primary sectors, such as agriculture, mining and manufacturing has been relatively stable.

* * * * *

Montana's unemployment rate is generally greater than the national figure. This consistent difference is almost entirely the result of the highly seasonal nature of Montana's industries. Nearly all of Montana's industries are more seasonal than their national counterparts, resulting in a higher average unemployment rate.

* * * * *

With the exception of the wood products and mining industries, employment in Montana is relatively insulated from national recessions. Overall Montana employment levels and unemployment rates are affected by recessions, but not to the degree that those of the more industrial states are influenced.

* * * * *

The periodic changes in Montana per capita income have been for the most part the result of variations in farm income. The effects of national recessions on Montana per capita income are relatively small. Western Montana, however, is more affected by national cycles than the remainder of the state

* * * * *

Since 1970, population estimates indicate that more individuals are coming into the state than leaving. This net inmigration is the reason why Montana's population has grown faster than the national rate. Other mountain states have also experienced similar growth patterns.

* * * * *

While Montana's agriculture has generally experienced greater prosperity in the early 1970's than in the 1960's, the blessings have been mixed. Since 1973, cattle prices have been sharply lower, grain prices took a critical dip in 1976, locally low levels of precipitation occurred in some years and production costs have increased at least twice as fast as the general rate of inflation. These facts have caused great economic hardship for some producers and for nearly all ranchers who depended primarily on cattle. Grain producers joined this list in 1976.

* * * * *

Employment in the wood products industry, an industry of overwhelming importance in western Montana, began to decline in 1974 and continued low through 1975. This employment decline was in response to the recession and sharp drop in housing construction. However, during the first half of 1976, housing starts were up approximately forty percent above the previous year's level.

* * * * *

Montana's production of coal has increased dramatically over the last few years, and additional increases can be expected in the future. Employment prospects in metallic mining are encouraging. Several copper deposits and one or more gold deposits may be developed and mined by open pit methods if metal prices remain stable or increase. The potential for the utilization of Montana's iron deposits is also believed to be very good.

* * * * *

Montana's crude oil production slipped from 34,533,962 barrels in 1974 to 32,850,749 barrels in 1975. During this same time, because the regulated price has been allowed to move upward, the value of the crude oil produced in 1975 grew to $275,096,151 over

$236,698,022 in 1974. The average yield per well was down significantly, but the total decrease in production was minimized by the large increase in the number of wells.

* * * * *

The travel sector, another major Montana industry, has grown substantially over the last few years. As national income and leisure time rise, it is likely that this sector will experience even greater gains, particularly in light of the spectacular natural attractions found in Montana. This natural beauty and colorful past is no doubt the reason for the current interest of major film producers in the state.

MONTANA'S ECONOMIC GROWTH

NTRODUCTION

The welfare of any locality, state, region, or nation is osely, but of course not exclusively, tied to economics. herefore, an idea of the future of Montana's economy is nportant to decision makers in both government and rivate business. Clearly, many of the changes which ffect Montana's economy are the result of external vents (national, international, climatic, etc.) over hich the state has little control. Furthermore, these iarket and policy changes are perhaps more the rule ian the exception. This high degree of uncertainty iakes speculation about the future a very unsure usiness.

Historically, Montana's economic role has been the pecialized one of providing raw materials for the ational marketplace. As a result of the state's natural esource base, the economy has been largely resource, ather than market oriented, so the importance of nanufacturing products for final consumption has been elatively low. In addition to such natural factors, this esource orientation has been partly reinforced by eography and the resultant relatively poor access to ational markets. Without any doubt, the resource ased industries (agriculture, mining and wood roducts) have provided the basis for the long term levelopment of the state, and in all likelihood it is these ndustries which will determine the future of Montana. Concentration in these industries has not been ccidental, but rather the result of natural market forces.

The relative importance of the primary industries, however, has changed over time. Perhaps the most dramatic long-term historical change which has affected not only Montana but the nation as well, has been the gradual shift in employment composition. At the turn of the century nearly everyone was employed in some form of primary production, while today the situation is quite different, with more employment in the service and trade related sectors. This reversal appears to be the result of two principal factors. First, the rapid productivity increases in the primary industries displaced workers, many of whom found employment within the service and trade sectors. Secondly, overall income increased, both in Montana and nationally, bidding up the demand for secondary activity. During this slow process, the state and nation became increasingly urbanized. In addition, the economic role of women simultaneously gained importance.

Substantial structural changes have occurred; but the fact still remains that the state's future growth is directly tied to the health of the primary sectors. Without the exporting industries there would be no secondary employment, and, without an increasing stimulus from the exporting industries, it is doubtful that service and trade growth will expand indefinitely.

It is difficult to overstate the economic significance of the resource industries on the overall economy of Montana. However, when discussing these industries it is often easy to overlook the importance of other sectors. The service and trade sectors do generate considerable employment and income, as do other industries. Simply stated, all sectors (and all the rest of the states for that matter) are interrelated, buying and selling, importing and exporting, where the success of each is dependent on the other. Montana's specialty, its competitive edge, is vastly different from that of the industrial East. To be sure, some industrial diversification will gradually occur in Montana. This metamorphosis will very likely be as slow as it was elsewhere, and will be determined by economic as well as environmental feasibility. Although this report cannot realistically touch on environmental trade-offs, they do exist, and will presumably play a major future role in shaping the state's economy.

The purpose of the following sections of the report is to present in greater depth the nature and condition of Montana's current economic structure. The performance of Montana in terms of employment, unemployment, income, and population is examined, followed by a series of close looks at the performance and future issues in each of Montana's major industries. Some long-term energy-related scenarios are also discussed. The intent throughout the report is not to recommend directions but to summarize both facts and issues that will aid the decision makers who will help shape the future of Montana.

EMPLOYMENT AND UNEMPLOYMENT

Employment

The most regularly gathered and reliable data concerning Montana's economy are employment statistics. Changes in employment levels and in the relative importance of industries in employment terms give a good idea of the direction of Montana's economy.

Table 1 shows that total employment grew about twice as much from 1970 to 1975 as it did between 1965 and 1970. This growth, however, was not evenly spread across economic sectors.

It is often useful to divide industries into primary industries which export goods and thus provide the base of activity for the region, and derivative industries which provide services to local residents and industries. Primary employment has actually declined slightly since 1970 while derivative employment has grown steadily. This behavior is puzzling to those who believe that derivative industrial growth can come only as a result of primary industrial growth. The problem results from several complicating factors.

Table 1

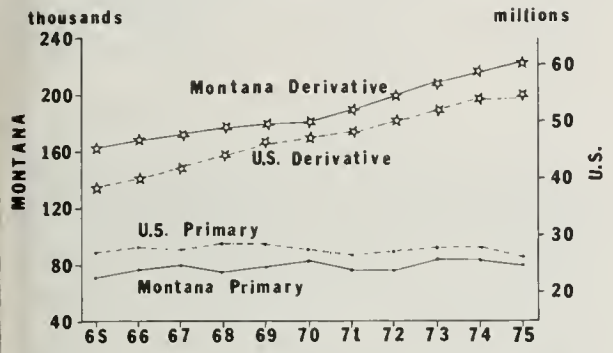
EMPLOYMENT IN SELECTED MONTANA INDUSTRIES

INDUSTRY	1965	1970	1975	Change 1965-70	Change 1970-75
PRIMARY					
Agriculture	35200	36100	34300	900	— 1800
Mining	7500	6600	6700	— 900	100
Metal	4600	4000	3100	— 600	—900
Coal, Quarrying and Non-metal	1100	800	1600	— 300	800
Oil and Gas	1800	1800	2000	00	200
Manufacturing	22200	23900	22200	1700	— 1700
Lumber and Wood Products	8600	8200	8200	— 400	00
Primary Metals	3600	4700	3300	1100	— 1400
Food and Kindred Product	4300	4300	3700	00	— 600
Other Manufacturing	5700	6700	7000	1000	300
Railroad	7500	6600	6100	— 900	— 500
Federal Government	12100	11900	14200	— 200	2300
Total Primary	84500	85100	83500	600	— 1600
DERIVATIVE					
Transportation, Communication and Utilities, excluding Railroad	10000	10800	13100	800	2300
Construction	12000	11000	12400	—1000	1400
Trade	42900	48100	59500	5200	11400
Services	33300	41800	55100	8500	13300
State and Local Government	33800	40700	50700	6900	10000
All Other	30000	28200	30900	—1800	2700
Total Derivative	16200	180600	221700	18600	41100
TOTAL	246500	265700	305200	19200	39500

SOURCE: Montana Department of Labor and Industry, Employment Security Division

Figure 1 compares United States and Montana employment from 1965 to 1975. The striking resemblance between the trends shows that the derivative growth phenomenon is not confined to Montana. Employment in the primary industries has been nearly constant while derivative employment has maintained a steady growth. Clearly, increases in derivative activity both in Montana and nationally cannot be explained simply as a result of primary activity.

fig. 1
PRIMARY AND DERIVATIVE EMPLOYMENT IN MONTANA AND U.S.



SOURCES: U.S. Department of Commerce, and the Montana Department of Labor and Industry.

This relative shift in employment composition is the result of long-term changes in the economy, several of which were mentioned in the introduction. There has also been a large increase in the labor force as a result of a change in the age structure of the population. The "baby boom" has resulted in more people entering the labor force than ever before. This age effect, coupled with the fact that more women are working, has greatly expanded the number of individuals seeking employment. The primary industries, where productivity has grown the most, have not been able to provide employment for these new workers. The service and trade sectors have not experienced this rapid growth in productivity and have absorbed these individuals. Simultaneously, consumption of the output of services and trade sectors has grown. Public and private sector services are increasingly substituted for activities once provided in the home. While it is true that many part-time positions have been offered in these sectors, even after adjustment for full time equivalents, the rate of increase in employment has been great.

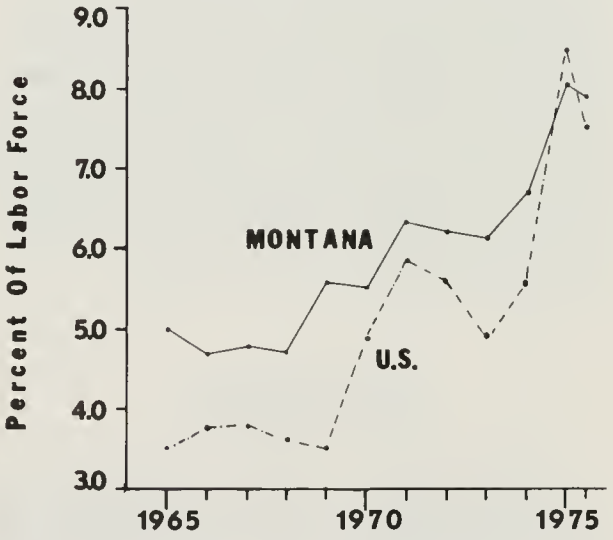
Although the preceding may be interpreted as underemphasizing the importance of primary industries to Montana, the intent is to explore the pattern of growth. Healthy primary industries are essential for the continued progress of the derivative industries.

Most of the primary industries as well as the government sector will be examined in more detail later in the report. Table 1 merely hints at the pattern of change. In manufacturing the decline in primary metals and food industries has not been matched by growth in other manufacturing, resulting in a decline in total manufacturing from 1970 to 1975. In the mining sector the rise of energy-related industries has compensated for the employment decline of metal mining in Montana. Agriculture, on the other hand, has shown a long, steady decline.

Unemployment

The unemployment rate is perhaps the most frequently used statistic in economic discussion, and perhaps the most misunderstood. Its calculation depends on two factors: the level of employment, and the total size of the labor force. Data for the former are gathered regularly so it can be accurately determined. But the "size of the labor force" is difficult even to define, and its calculation requires many assumptions. The methods change frequently and differ between states. Thus, comparisons over time and with national figures are made with some risk.

fig.2
UNEMPLOYMENT IN MONTANA AND THE UNITED STATES, 1965 to 1975



SOURCES: Montana Department of Labor and Industry, and the U.S. Bureau of Labor Statistics.

With that caution in mind, Figure 2 suggests several observations. The first is the general rise of unemployment rates over time. This has been primarily the result of the tremendous growth in the labor force mentioned earlier. Although service and trade sectors have grown and absorbed most of the new entrants into the labor force, not all new labor force entrants have been successful at finding work, resulting in higher unemployment rates. The spread between the Montana rate and that of the United States has been fairly consistent except for recession years. This regular

pattern points to a structural difference in the labor force rather than to poor economic performance. Montana's weather has a great effect on seasonal employment patterns of its industries. In fact, almost all of Montana's industries are more seasonal than their national counterparts. Consequently, during the winter months Montana has many more people unemployed proportionate to its labor force than would be expected nationally for that time of year. This results in a higher average unemployment rate and accounts for the difference between Montana and national rates.

The last noticeable feature of Figure 2 is the differential effect of recessions on Montana and the nation. The figure shows a narrowing of the difference between rates in 1970 and 1971 and an actual reversal of positions during the 1974 and 1975 recession. Montana is relatively insulated from national recessions because of the state's agricultural base. It must not be forgotten, however, that western Montana is much more sensitive to recessions than the rest of the state. The copper mining and metal processing sectors tend to be quite sensitive to business cycles. The lumber and wood products industry is also affected both by declines in the housing market and by industrial recessions which reduce the demand for packaging products.

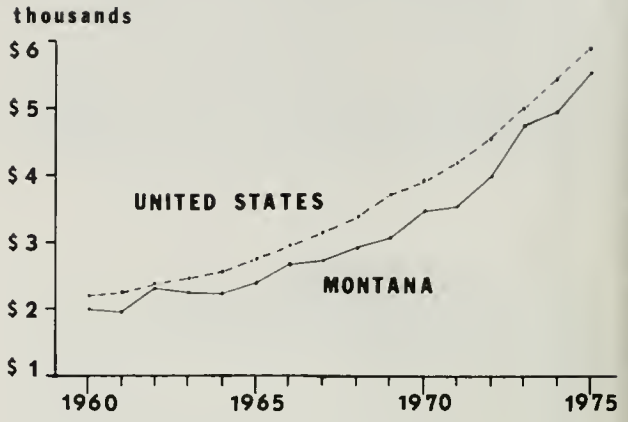
What can Montanans expect in the future in terms of employment structure and unemployment? Given no radical declines in total primary employment, Montana should see continued growth in the derivative sector and keep pace with national growth. This growth will slow as the effect of the "baby boom" passes and reduces the number of additions to the labor force. As long as the method of calculating unemployment rates remains unchanged, Montana should continue to maintain its one percent difference from national rates.

INCOME

Income data serve as another useful indication of economic well-being. Of course, the overall welfare of the state is determined by many intangible factors which are perhaps equally important; but no one would suggest that intangible income buys groceries.

Montana per capita income has grown at approximately the national rate; sometimes faster, and sometimes slower. However, since 1960 Montana per capita income has been roughly ten percent lower than the national level. This consistent difference, illustrated in Figure 3, is difficult to explain, but may be partly due to the rural nature of the state. In other words, the spread may be the result of industrial composition and a lower than average labor force participation rate. While numerous explanations, some of them non-economic, could be advanced, the issue is so clouded by data estimation problems that no single answer exists.

fig. 3
PER CAPITA INCOME IN MONTANA AND THE U.S.
(Current Dollars)

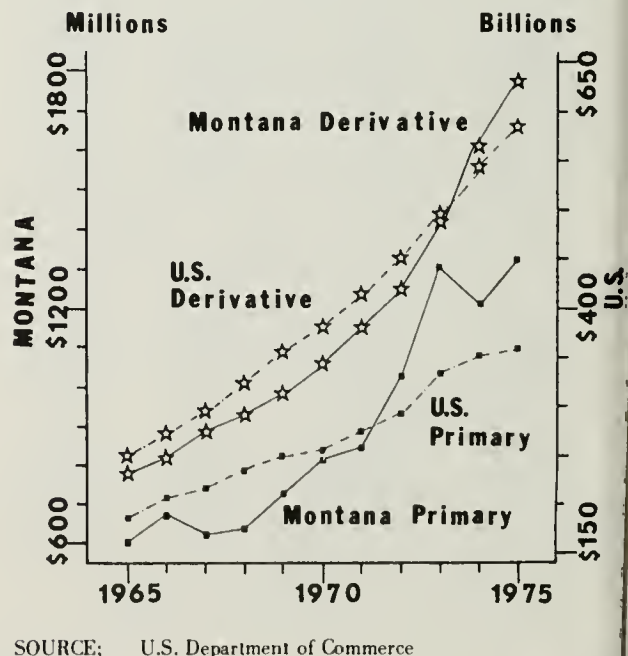


SOURCE: U.S. Department of Commerce

The periodic ups and downs in Montana per capita income have for the most part been the result of variations in farm income. The comparatively small variations in the national trend have been the result of business cycles, but as has been pointed out, agricultural states such as Montana are relatively insensitive to national cycles. Certainly some effects are felt (e.g., wood products and metal mining), but not to the degree experienced by the most industrialized states.

In terms of the long-run trend, much of the absolute increase in income, both here and nationally, has been

fig. 4
PRIMARY AND DERIVATIVE INCOME IN MONTANA AND U.S.



SOURCE; U.S. Department of Commerce

Table 2
EARNINGS FOR SELECTED INDUSTRIES IN MONTANA
Millions of Current Dollars

	1965	1970	1974	1975	% Change 1965-70	% Change 1970-75
PRIMARY INDUSTRIES						
Agriculture	213	330	524	582	54.9	76.4
Mining	55	64	96	102	16.4	59.4
Metal	34	40	52	NA	17.6	NA
Coal, Quarrying and Non-metal	8	9	20	NA	12.5	NA
Oil and Gas	13	15	24	NA	15.4	NA
Manufacturing	151	199	266	271	31.8	36.2
Lumber and Wood Products	54	65	99	NA	20.4	NA
Primary Metals	28	41	43	NA	46.4	NA
Food and Kindred Products	27	32	40	NA	18.5	NA
Other Manufacturing	42	61	84	NA	17.3	NA
Railroad	54	68	93	103	25.9	51.5
Federal Government	128	165	238	279	28.9	69.1
Total Primary	601	826	1217	1337	37.4	61.9
DERIVATIVE INDUSTRIES						
Utilities excluding Railroad	73	98	156	159	34.2	62.2
Construction	103	124	189	181	16.9	46.0
Trade	234	306	458	511	30.8	67.0
Services	221	313	452	521	41.6	66.5
State and Local Government	154	223	348	404	44.8	81.2
Total Derivative	785	1064	1603	1776	35.5	66.9
TOTAL	1386	1890	2820	3113	36.4	64.7

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis.

nflationary. For example, during the sixteen year period 1960-1975, national unadjusted per capita income grew 163 percent, while the real growth in purchasing power was much lower, at 45 percent. Although the national price index could be used to adjust the Montana data, the result might not accurately represent real gains. Montana prices as well as the type of products purchased here might vary significantly from the national norm. Unfortunately, no specific Montana price information is available, further complicating national and state comparisons. Because of such difficulties, a review of the sources of Montana income is more helpful in understanding income trends. This information is provided in Table 2 and depicted graphically in Figure 4.

Aside from a few erratic changes, the result of exceptionally good agricultural years, the composition of Montana income has essentially followed the national trend, with derivative income growing more than primary income. However, this is not surprising because most of the employment growth has been found within the derivative sector.

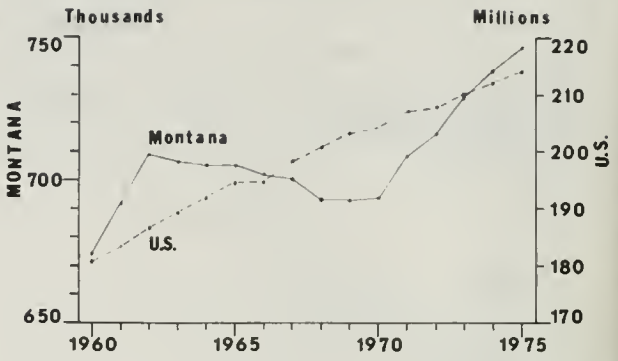
In summary, most of the recent growth in the primary category originated with the agricultural and federal government sectors. Mining and railroad activity also grew, but at a more moderate rate. Overall manufacturing increases were weak, growing somewhat slower than the national rate of inflation. Growth within the derivative industries was somewhat more uniform.

The relatively slow growth in construction was related to the national downturn in the housing market which occurred in 1973. The fastest growing sector, statewide, was state and local government. More attention will be devoted to a discussion of specific industry changes and issues in the next section of the report.

POPULATION

Montana's population, like employment, has shown different behavior in the seventies than in the two previous decades. In the fifties and sixties, economic growth was slow and, as a result, many residents left the state to find work. As Figure 5 shows, in the sixties, Montana's population grew slower than the national rate. Since 1970, however, Census Bureau population estimates for Montana indicate that more individuals are coming into the state than leaving. This net inmigration is the reason why Montana's population has grown relatively faster than the national figure. This recent growth is presumably tied to the change in performance of Montana's economy. Other mountain states have also experienced similar growth patterns.

fig. 5
POPULATION OF MONTANA
AND THE U.S.



SOURCE: U.S. Census Bureau

Figure 6 explores the regional aspects of migration flows. All of western Montana has attracted people, while the dominantly agricultural areas continued to lose residents, slowly. The growth in the south-central part of the state is largely that of Billings. Overall, most of the movement has been toward the cities and more mountainous areas of the state.

fig. 6

NET MIGRATION FOR REGIONS IN MONTANA
1970 to 1975

SOURCE: U.S. Census Bureau

The data on which these conclusions are based must, however, be viewed with a certain amount of caution. Mid-decade estimates are not based upon an actual head count, and fairly serious errors were made by the Bureau of the Census in the 1960's. However, there is good reason to believe that the current estimates are not exaggerated, since the estimated population increases are reasonably consistent with other available economic data, which indicate net inmigration has occurred in the seventies.

THE INTERRELATIONSHIP BETWEEN INCOME, EMPLOYMENT AND POPULATION

The reconciliation between income, employment, unemployment and population in any region is extremely difficult. For instance, increasing employment levels are no guarantee of reduced unemployment rates, because increases in employment opportunities can be more than offset by changes in the labor force, i.e., the number of people actively seeking employment. Typically, regions which have rapid employment (or population) growth also have relatively high unemployment rates as a result of greater competition for jobs. This increased competition may result from either inmigration or higher participation rates within the region.

The population effects of employment increases are equally difficult to analyze. The population change resulting from growth in the derivative sector is generally much lower than that resulting from an increase in basic activity. In Montana, many of the jobs within the derivative sectors have been filled by females and, as a result, migration effects were negligible. It is not surprising, then, that employment is currently growing much faster than population, as shown in Table 3. Even though many of these new jobs have been part-time and low paying, derivative growth has resulted in substantial increases in total income.

The relationship between population and income is very definitely a two-way road. The outmigration of the fifties and sixties kept per capita income levels for the remaining population higher than they would have been in the absence of migration. Of course, this migration was not without cost. Many young people who were eager to work in Montana went shopping for jobs elsewhere.

The situation is now reversed and census estimates, as well as several other sources, indicate a fairly high level of inmigration. Ironically, many of the individuals appear to be moving into areas of the state where unemployment is quite high.

Clearly, Montana's economy is in a constant state of flux, with many economic as well as environmental tradeoffs involved. The next section focuses on what can be expected for the next several years. Important issues for each of the major industries are considered.

Table 3

MONTANA POPULATION AND EMPLOYMENT

Year	Population	Employment	FTE Adjusted Employment*
1970	694,409	264,000	249,600
1971	709,400	272,500	253,900
1972	716,100	281,100	260,100
1973	729,800	294,400	275,800
1974	737,000	301,700	279,800
1975	747,500	305,200	279,200
Percent Change (1970-75)	7.6%	15.6%	11.9%

SOURCES: U.S. Bureau of the Census; Montana Department of Labor and Industry, Employment Security Division

*NOTE: The employment data are expressed in full time equivalents (FTE's), i.e., adjusted for part-time employment.

A CLOSER LOOK AT THE MAJOR INDUSTRIES

The following discussion takes a closer look at Montana's most important economic sectors. In the agricultural, wood products, and oil and gas sections, individuals familiar with these industries were asked to comment on recent trends and to speculate about the future of their respective sectors. In addition, several authors commented on possible policy measures which, in their view, could be undertaken by Montana state government to improve industrial strength in Montana. These industry descriptions are followed by a review of the travel industry and an analysis of state and local government employment and revenue growth.

AGRICULTURE AND MONTANA'S ECONOMY

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In the past eight years, the economic size of Montana's agriculture has increased significantly. Its cash receipts more than doubled since 1968. If we are to understand the economic future of Montana, three questions must be answered with regards to its agriculture; 1) What caused the recent economic growth in Montana's agriculture? 2) What's likely to happen in the future? and, 3) What kind of agricultural policies on the part of the State of Montana would be likely to improve that future?

While Montana's agriculture has generally experienced greater prosperity in the early 1970's than in the 1960's, the blessings have been mixed. Since 1973, cattle prices have been sharply lower, grain prices took a critical dip in 1976, locally low levels of precipitation occurred in some years and production costs have increased at least twice as fast as the general rate of inflation. These facts have caused great economic hardship for some producers and for nearly all ranchers who depended primarily on cattle. Grain producers joined this list in 1976. The increase in the general level of agricultural prosperity in the early 1970's was largely due to increased production and better grain prices.

Most of the factors causing this increase in production have resulted in what are probably permanent increases in the capacity of Montana's agriculture to produce. However, this may not be true for one factor. Despite local droughts, weather conditions were generally very favorable with record annual precipitations recorded for many sites in Montana. We have no evidence of any permanent changes in weather conditions and over the long run, we must expect weather conditions to "average out." We can predict that individual farmers and ranchers, agribusiness (in fact, business in general) as well as state and local governments will have to face the implications of decreased agricultural production caused by unfavorable weather conditions.

Since we cannot prevent such occurrences, we must concentrate on mitigating their impact. Providing for supplemental sources of credit in cooperation with existing agricultural credit institutions, expanded irrigated acreage based on economic feasibility, better information about suitable production methods, provisions for emergency tax relief if such relief is required, and other such policies can be steps in the right direction to mitigate the impact of adverse weather that will certainly occur sometime in the future.

Grain prices improved between 1970 and 1975 primarily because of higher demand for U.S. grain in the international market. There have been three principal reasons for this increased demand. First, world demand for grain increased because more countries could afford to buy more grain, world population increases played a secondary role. Second, the demand for U.S. wheat increased because the U.S. dollar was devalued and our agricultural goods became relatively better buys for many foreign customers. Third, Western Wheat and Great Plains Wheat, both supported by Montana grain producers through the Montana Wheat Research and Marketing Committee in cooperation with the United States Department of Agriculture, created new and expanded markets for wheat.

While increased feed grain prices have contributed to downward pressure on feeder cattle prices during the past few years, the principal cause for weaker beef prices has been high cattle numbers. The cattle cycle (each lasting about ten years) has been with us since at least 1900. However, much of the increase in the beef supply during the past quarter of a century has come about because of relatively cheap grain. There was an increase in both the length of the feeding period and the number of cattle on feed. Cattle on feed increased from around 4 million twenty five years ago, to 14 million head in 1973. As more younger cattle went into the feedlots, more pasture was available for breeding stock and this contributed to a dramatic expansion of the U.S. cow herd.

While the world demand for agricultural products will continue to increase, so will the world's ability to produce food. The prosperity of Montana's agriculture in the future, as in the past, will depend on its competitive strength. The abilities of Montana's farmers and ranchers, the vigor of its agribusiness community, and the environment established by state and local

government will all influence that competitive strength. These items along with three major economic forces and the uncertainty of weather will largely determine what the next few years hold for Montana's agriculture.

The first of these economic forces relates to the price of grain. Between 1963 and 1971, U.S. wheat production was usually 1.3 billion bushels or less. Exports between 1963 and 1971 were between 500 and 800 million bushels. Over half of the exports resulted from various government subsidy programs. Domestic use for food and feed was around 600-800 million bushels. Carryover stocks on 1 July were usually in excess of 800 million bushels and reached 1.3 billion bushels in 1962. Most of this inventory was government controlled. Regardless of how well they are handled, high inventories mean lower grain prices to producers. In 1974, 1 July carryover stocks plunged to 250 million bushels. Not surprisingly, prices for the 1973 crop were high. Carryover stocks have been building up since that time. The carryover on 1 July, 1977 will probably exceed 800 million bushels and could conceivably reach 1 billion bushels. Wheat prices dropped sharply in 1976 because of these developments. Barring some combination of (1) dramatic decreases in U.S. production, (2) significant increases in export sales (increasing from around 1 billion to at least 1.5 billion bushels) and (3) higher federal federal loan rates for wheat, prices are not likely to strengthen significantly during the next few years. In fact, if unfavorable federal farm legislation were passed in 1977, wheat prices would probably become even lower than they are now. The prospect of grain prices remaining at near present levels and perhaps even decreasing does not bode well for either Montana wheat producers or the rest of the state's economy.

The second economic force relates to beef prices. While there are clouds on the horizon, the price outlook for the next several years is more optimistic than for wheat. We're still seeing a reduction in U.S. cattle numbers and unless this cattle cycle is dramatically different from its predecessors, this means stronger cattle prices in the near future. However, price recovery has not been as strong as most of the experts predicted. Consumer demand has remained strong, but widely fluctuating feeding margins have provided more risk than cattle feeders preferred and the demand for feeder cattle has not been strong. High slaughter levels, including the slaughter of many grass fed cattle, has meant high levels of beef supply at the retail level. Beef imports, even though some have argued they are desirable from a broad social point of view, have resulted in lower prices to Montana's ranchers. The 2 billion pounds of beef imported into the U.S. during the past year have lowered producer prices. Preliminary estimates indicate that imports of an added one hundred million pounds of beef at the margin will lower the price by at least 38-40 cents per hundredweight to the producers of Montana feeder cattle.

The third set of economic forces relates to the impact of inflation on Montana agriculture. In the recent past, costs of agricultural production increased at about twice the rate of the Consumer Price Index. Even inflation rates as low as 6 percent would mean a dramatic intensification of the cost-prize squeeze in as little as two years. General inflation rates of 10 and 12 percent would mean intolerable cost increases for Montana agriculture. And the costs of production, unlike prices received, seem to move in one direction only. Closely allied to this problem is the impact of inflation on regulated freight rates. Under the present regulatory procedures, we need more competing modes of transportation if transportation costs are to decrease. High transportation costs tend to isolate Montana's agricultural products from markets. We need at least enough in-state processing to help producers get a competitive price for their products.

The uncertainty associated with weather conditions has already been mentioned. Montana has always been a great "next year" country. But the optimism of Montana's citizens should not blind the agricultural, business, and political leaders to the likely impact of adverse weather conditions on Montana's agriculture.

Alternative levels of cash receipts for the next two years from farm and ranch marketings are presented in Table 4 below. The "best" total figure ($1,373,000,000) is 160% of the "worst" total figure ($856,000,000). It wasn't until 1972 that cash receipts exceeded the $856,000,000 figure. The cash receipts for 1973 were 214 percent of the cash receipts for 1968. At least the total figures, if not each component, represent occurrences well within the range of our recent experience. Cash receipts outside of the range represented by the "best" and "worst" could occur, but are not likely during the next two years unless we have a severe drought which is statewide, an expected collapse of markets, or extremely high prices caused by some widespread crop failures in the rest of the world.

Table 4

ALTERNATIVE LEVELS OF CASH RECEIPTS FOR MONTANA AGRICULTURE DURING LATE 1970'S

Millions of Dollars

	Strong Markets & Good Weather Conditions	Strong Markets & Normal Weather Conditions	Weaker Markets & Normal Weather Conditions	Weaker Markets & Unfavorable Conditions
Cattle & Calves	$459	$468	$408	$384
Wheat & Barley	$672	$552	$420	$344
Other	$206	$180	$146	$128
Total	$1,373	$1,200	$974	$856

There are three general categories of approaches that the Legislature and Executive Branch can use to enhance the prosperity of Montana agriculture and thereby improve the economic environment for all the citizens of Montana. They can (1) influence national and regional political and business policies in ways which are favorable to Montana, (2) make specific public investments which will improve the competitive strength of Montana agriculture, and (3) develop favorable state policies which deal with the interface between the private sector and state and local government agencies.

The current federal law regarding agricultural policy will expire this year. Discussions have alreeady begun on the type of new legislation that will be in force after the 1977 crop year is ended. Montana farm producers must have an opportunity to learn about the alternatives they face and then be able to express their preferences effectively. While many other national and regional policies are important, the current agricultural policy debate in the U.S. Congress is probably the most important single issue to be resolved. In terms of economic importance to Montana, more reasonable levels of meat import is of nearly equal importance.

If U.S. food policy continues to follow the twin themes of cheap food and maximum export earnings, Montana producers along with the rest of the producers in the U.S. will continue to be among the principal victims of the greatly increased price uncertainty which results. If this continues, the list of victims will grow as our capacity to produce shrinks as the result of a slowdown of investment in agriculture. The new agricultural policies must give the Montana farmer and rancher at least a reasonable chance of paying his costs of production (including his property taxes), retaining enough money so that he can support his family at an acceptable level, and hopefully earning a decent return on his investment.

Carefully planned investment of public funds can improve the competitive strength of Montana's agriculture. The benefits of these investments will not be restricted to agriculture, but will result in benefits to the entire economy of Montana. Examples of some opportunities could include increased support of research and education in the areas of animal diseases, genetics, crop and rangeland management, and managerial skills.

The opportunities for the profitable investment of public funds mentioned above will not succeed by themselves. Their success must be based on the decisions of thousands of Montana farmers and ranchers. These public investments are aimed at providing farmers and ranchers with more profitable alternatives. But Montana's agricultural producers will not be the only ones to benefit. The economy of the entire state will benefit. Proper action by state and local government are required if we are all to realize the full economic potential of Montana's agriculture.

THE WOOD PRODUCTS INDUSTRY IN MONTANA

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The wood products industry is concentrated in western Montana, where it is of overwhelming importance. The industry is the area's economic barometer. The western counties prosper when the forest industries are doing well. When the timber industry is in trouble, western Montana is in economic trouble.

A 1972 report estimated that approximately 43 percent of total employment and 51 percent of total personal income in eight western Montana counties is directly or indirectly dependent upon the wood products industry, including pulp and paper. For the state as a whole, the estimates are considerably smaller: 12 percent for employment and 11 percent for income.[1] Forest activities provide relatively high-paying jobs in a state and area (western Montana) where per capita incomes are low.

Statewide industry employment reached a high point in 1973, when 10,187 persons were at work in logging camps, sawmills, plywood and particle board plants, millwork and miscellaneous activities, and the pulp and paper mill.

Employment began to decline in 1974 and continued low through 1975, in response to the recession and the sharp decline in housing construction.[2] Lumber and plywood production fell off dramatically; 1975 lumber output was 28 percent below 1973 and the lowest since 1960.[3] The paper market decline in 1975 resulted in temporary shutdowns at the Missoula mill. Average annual employment in the combined forest industries fell off by about 14 percent between 1973 and 1975. At the same time, the average number of hours worked per week was reduced from 41 in 1973 to 36 in 1976. Even so, the unemployment rate in 1975 averaged about 11 percent in the Missoula area (Missoula, Sanders, Mineral and Ravalli counties) and 13 percent in the Kalispell area (Flathead, Lincoln and Lake counties).[4] It is worth noting that without the diversification which has taken place in the industry during recent years, which lessened the dependence on lumber production, things could have been much worse.

The first half of 1976 saw some improvement in the industry. United States housing starts were approximately 40 percent above January-June 1975.[5] The paper market showed improvement. Industry employment in the state through May (no later figures are available) averaged about 10 percent above the first five months of 1975, but it was still well below comparable periods in 1973 and 1974.[6]

Most experts expect housing to continue to pick up—although slowly—through the remainder of 1976 and in 1977. One projection puts 1976 starts at 36 percent over 1975 and anticipates a 14 percent increase for 1977, with the expansion leveling off during the latter half of that year.[7] Once lumber and plywood inventories are worked off, further increases in production should occur. The paper market also is expected to continue to improve.

Under normal conditions we might expect the recovery to continue, at least through 1977. But normal is not the name of the game; the Montana industry faces uncertainty from another quarter—recent court decisions which may affect the availaible timber supply.

Two U.S. District Court decisions in recent months have declared the practice of clearcutting timber on public lands to be illegal under the 1897 Organic Act. The decisions further stated that under the Act trees sold

[1]Johnson, Maxine C., "Wood Products in Montana: S Special Report on the Industry's Impact on Montana's Income and Employment," Montana Business Quarterly, Spring 1972.

[2]Montana Department of Labor and Industry, Employment Security Division.

[3]Western Wood Products Association, 1975 Statistical Yearbook.

[4]Montana Department of Labor and Industry, Employment Security Division.

[5]U.S. Department of Commerce.

[6]Montana Department of Labor and Industry, Employment Security Division.

[7]Lionel D. Edie & Company.

for harvest by the Forest Service must be large, physiologically mature, or dead and that they must be individually marked for cutting.

A third decision, by a U.S. District Court in Texas, states that the Multiple Use Sustained Yield Act of 1960 also prohibits clearcutting. At the time of the latter decision, Congress was in the process of debating amendments to the Organic Act; there may not be time to also amend the Multiple Use Act this year. Furthermore, it is not yet clear how far Congress will go in prescribing and restricting timber harvesting methods.

The U.S. Forest Service estimates that timber cut from the national forests could be reduced by 75 percent nationwide. for a decade if the court decisions were enforced, and by 50 percent after that. The decisions are particularly threatening in Montana, where approximately one-half of the timber supply comes from federal lands.

The resolution of the timber harvest debate will be made in the national political arena by the U.S. Congress. Montanans should recognize that the possibility of serious curtailment of a major state export industry does exist. It could be temporary, while a solution is worked out, or long term, depending upon what legislation is finally passed. We have grown accustomed to public debate on Forest Service timber management and to industry's "viewing with alarm" various policy changes. But both the Forest Service and the industry agree that these recent court decision could seriously affect the Montana forest industries, if Congress does not come up with the new legislation that permits clearcutting where it is an appropriate management technique.

Let us assume that a reasonable compromise as to clearcutting and timber sales on public lands can be achieved, and speculate as to what changes may occur in the Montana forest industry over the next five or ten years. I expect to see fewer firms, with less emphasis on lumber and plywood and more production of products such as particleboard, new structural products made of chips, and pulp and paper. I expect more integrated firms producing a combination of products utilizing both sawtimber and residuals. A better use of the entire wood resource can help maintain the industry as an important contributor to Montana's economic welfare and is essential to its survival.

THE MINING INDUSTRY

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Coal

Montana's production of coal by large surface mines has increased dramatically over the last few years, and additional increases can be expected in the future.

Current producers of large tonnages of coal are the Western Energy Company, a wholly owned subsidiary of Montana Power Company, mining at Colstrip in two separate operations; Peabody Coal Company, also mining near Colstrip; Westmoreland Resources Company, at Sarpy Creek; Decker Coal Company, with a mine at Decker; and Knife River Coal Mining Company, producing lignite near Savage. All of these producers mine subbituminous coal except the Knife River Coal Mining Company. The 1974 and 1975 production from these mining operations is listed in Table 5.

Table 5

PRODUCTION FROM THE FIVE MAJOR STRIP MINES IN MONTANA

Company	Production, in Tons 1975	1974
Western Energy (Colstrip)	6,400,000	3,212,000
Peabody (Colstrip)	2,100,846	2,228,525
Decker	9,200,000	6,800,000
Knife River[1]	300,051	329,588
Westmoreland	4,048,082	1,457,755
Total	22,048,979	14,027,868

[1]Knife River mines lignite for local use.

Increases in coal production can be achieved by increased production from existing mines and by opening new ones. All of the existing subbituminous mines have capacity to expand, and it is expected that production from these mines will be greater in 1976 than in 1975. In addition, two or possibly three new large surface mines are being planned. Two of these are by Peter Kiewit Sons' Company, a partner in the existing Decker mining operation with Pacific Power and Light Company. Both of these mines are under development. One borders the existing Decker mine to the north, called the North Extension, and the other is directly east and adjacent to the Tongue River Reservoir east of the Decker mine. The East Decker mine is projected to reach a production 6,600,000 tons and have employment for about 250 persons. The North Extension will have lesser production, a maximium of 3,000,000 tons per year.

A third mine, proposed by Shell Oil Company, has been planned on the southeastern corner of the Crow Indian Reservation at Young's Creek, but plans have been delayed by action of the Crow Indian Tribal Council. This mine's initial production was to be 2,000,000 tons per year, increasing to 8,000,000 tons per year by the tenth year of production with employment at that time being 208.

Plans for new mines may now proceed on a more orderly basis, as the federal government is in the process of preparing additional lands for competitive coal leasing. This action is particularly important in Montana where the coal ownership is split between the federal government, the State of Montana, and private ownership.

The lignite mined by Knife River Coal Mining Company at Savage is shipped to Sidney to be utilized by Montana-Dakota Utilities Company. Except for the coal mined at Colstrip and burned by the Montana Power Company there and in its Corette plant at Billings, all of the subbituminous coal is being shipped by rail to midwestern utilities. These markets are expected to continue to expand since, in the near term, burning of low-sulphur coal offers the best way for utilities to meet the air-emission standards.

Copper and Other Mining

Copper now accounts for the major part of income from Montana's metals and nonmetals, although other commodities such as iron, manganese, talc, lead and zinc, and previous metals will no doubt contribute larger amounts in the next several decades than at present.

Employment trends and employment prospects are encouraging for metal and nonmetal resources. Several copper deposits and one or more gold deposits may be developed and mined by open-pit methods if metal prices remain stable or increase. Future development and production and consequent employment in open-pit and underground mining of Montana's iron deposits are believed to be very good.

Development of copper and zinc reserves in the Butte district by block caving may begin within the next 10 years, thereby increasing employment for Silver Bow County. Other increased employment may come about by reactivating phosphate mining and processing in western Montana, discovery of new talc, silica, and vermiculite deposits, and the increased production of building stone and expandable shale and clay.

The greater percentage of income from metallic mineral production within Montana has come from the Anaconda Company's Berkeley pit and underground mines of the Butte district, but underground production of copper and other base and precious metals ceased late in 1975. The Anaconda Company will continue to produce from open pits, but underground mining of Butte veins as practiced prior to 1975 will probably never resume. About 52,000 tons of ore per day is mined from the Berkeley pit, and the Black Pine (Inspiration Copper) mine near Philipsburg produces 250 to 300 tpd of silver-lead-silica ore used as a flux at the Anaconda smelter.

The U.S. Bureau of Mines reports that Montana's 1974 metallic and nonmetallic mineral production was valued at 276 million dollars, a 29 percent increase over 1973. Metals that showed significant increases in value over the previous year were gold, silver, and copper. Smaller increases were reported for zinc and lead. Nonmetallic mineral production remained the same, although value increases are reported for clay, stone, talc, phosphate rock, lime and gemstrones. The value of sand and gravel production decreased 20 percent.

Montana's metallic and nonmetallic mineral production for 1975 was valued at 202 million dollars, a decrease of 27 percent from the 1974 value. The value loss is attributed to the decline in copper and silver values (36 percent), and gold values (35 percent), which was not entirely offset by value increases for phosphate rock, talc and stone.

Mineral Prices

In mid-1973 copper was quoted at 60 cents a pound, and by September 1974 had risen to 86 cents a pound. Between March and December 1974 the price ranged between 60 and 65 cents per pound. From April 15 to May 20, 1976, copper prices ranged between 66 and 70 cents. The demand for copper seems to be firm, and the price should remain about 75 cents or possibly increase a few cents per pound during 1976, provided the demand remains good. Because of weak demand for copper during 1975, however, large stockpiles were built up by the copper producers.

Gold prices have fallen considerably from $162.85 in August 1975 to $123.30 per ounce (July 1976). Lead and zinc prices have been relatively stable over the last three years. Silver has been more erratic and has ranged from $3.89 to $5.02 in 1976.

Future Development and Production Potential

Large reserves of manganese at Philipsburg and Butte have a reasonable chance of being developed in the future. A large zinc ore reserve is present in the Butte district, and if zinc prices remain stable or increase, the possibility of producing zinc ore (none is being mined now) is considerably enhanced. Within the last few years Anaconda Company geologists have become aware of a copper-silver-molybdenite deposit within the central Butte district. The cupola-like part of this ore body is about 3,000 feet below surface; therefore, a block-caving method to mine this deposit is being contemplated. This deposit is estimated to contain several hundred million tons of ore higher in grade than present Berkeley pit ore, but it will not be mined until those ore reserves are exhausted (about 12 years). The development and production of this deposit will increase employment for Silver Bow County. Other deposits that may be developed to produce in the near future include the Spar Lake copper deposit near Troy, the Anaconda copper property at Lincoln, the copper-chromium-iron deposit in the Stillwater Complex, the Golden Sunlight deposit at Whitehall (gold), and the German Gulch deposit near Anaconda (gold).

Exploration for talc deposits is active in Madison and Beaverhead counties, and it is believed that additional deposits will be discovered in these areas. The Pony vermiculite deposit is being purchased by a major company, and ore reserves may be sufficient to encourage development and production. Other commodities that are being produced in Montana include silica, building stone, and expanded shale.

THE OIL AND GAS INDUSTRY

DON ALLEN
The Montana Petroleum Association

Crude Oil in Montana

Montana's crude oil production slipped from 34,533,962 barrels in 1974 to 32,850,749 barrels in 1975. During this same time, because the regulated price has been allowed to move upward and despite the late minimum effect of the rollback included in the energy legislation passed in late 1975, the value of the crude oil produced in 1975 grew to 257,086,151 over 236,698,022 in 1974. The average yield per well was down significantly, but the total decrease in production was minimized by the large increase in the number of wells.

Montana's proved reserves, as of December 31, 1975 were estimated to be 164 million barrels.

There are many factors that will determine future reserves and production in the state:

The price at the wellhead allowed by Congress.

The extent of additional secondary and tertiary recovery in known fields (such as the experiment now being conducted on the Bell Creek field. This type activity will greatly depend on allowable price.)

The outcome of pending federal tax legislation.

Legislation which would either encourage or discourage further exploration in Montana versus other states.

The extent of allowed exploration on U.S. Forest Land and state lands.

The economic impact of oil production in the state is significant—amounting to over 18.8 million dollars for the fiscal year 1974-75. In looking at the future potential impact of possible increases allowed to be paid for crude oil, it is noteworthy that the property tax on net proceeds from oil and gas production and oil field equipment almost doubled from fiscal year 1974-75 to fiscal year 1975-76.

Refining

Montana's seven refineries play a key role in the state's economy.

The three refineries in the Billings area—Continental Oil Co. and Exxon in Billings, and Farmer's Union in Laurel, account for over 88% of the refining capacity in Montana. The other four refineries, Big West Oil and Kevin, Phillips Petroleum at Great Falls, Tesoro at Wolf Point, and Westco at Cut Bank make up the total throughput capacity of 157,431 barrels per day. In 1975, the refineries processed an average of 83.% capacity per day.

It is imperative that a new source of crude supply be arranged for Montana's refineries by 1978, since the scheduled reduction in Canadian exports (which will expire entirely by the end of 1981) will have cut the supply from that source in two years to a lvel that would cause serious cutbacks in the crude supply needed to run the state's refineries.

The seven refineries provide jobs for about 1,300 people with annual payrolls in excess of $20 million and a total of almost $4 million in various taxes paid each year.

Natural Gas

Natural gas production of 43,622,602 Mcf for 1975 represents a 6,769,065 Mcf decrease from 50,391,667 Mcf shown for 1974. This is largely due to the duplicate inclusion of storage gas at Cedar Creek Field into the reported produced from seven additional areas in 1975 that were not on stream in 1974; including Bears Den Field in Liberty County, Brown's Coulee and Coal Coulee in Hill County, North Clark's Fork and South Clark's Fork in Carbon County, Pumpkin Creek in Custer County, and Strawberry Creek in Toole County.

The dominant interest in the shallow gas producing sands of northern Montana and oil bearing Tyler sands of central Montana is expected to continue in 1976, along with possible increase in exploratory drilling for deeper reservoirs in the Williston Basin area of northeastern

Montana. Recent major discoveries in Wyoming and existing production in the same formation in Canada have resulted in a significant renewed interest in the overthrust belt area of Montana.

Depending on how some major issues such as access to federal and state land, grizzly habitat, and the price of gas are resolved, the future development of this area could prove a vital source of badly needed new gas supplies to offset dwindling supplies from Canada and depletion of existing wells.

In view of total gas reserves of only 760,262 million cubic feet, it is critical to the operation of some industries such as wood products, and the overall health of Montana's economy to obtain new sources of natural gas.

TRAVEL

No review of Montana's industries would be complete without a discussion of the importance of tourism and travel. Unfortunately, employment and income data are gathered in such a way that reliable information on this sector is extremely limited. Service and trade sector data are reported by type of economic activity, and not by the type of customers served. For example, a restaurant serves both instate as well as out-of-state residents, so it is difficult to determine whether the employment and income generated by such a firm is primary (serving non-residents) or derivative (serving the local economy). Receipts or expenditure estimates are, however, produced by the Montana Travel Promotion Unit of the Department of Highways. This information and an estimate of income generated by each sales dollar implies that the overall travel industry generates approximately 13,000 full and part-time jobs and about 80 million dollars in income. Table 6 provides a basis of comparison illustrating the importance of this industry.

Table 6

BASIC INDUSTRIES IN MONTANA (1974)

INDUSTRY	PERCENT OF TOTAL INCOME
Agriculture	14.4%
Federal Government	6.5%
Wood Products	3.0%
Mining	2.6%
Rail Transportation	2.5%
Travel Industry	2.2%
Other Manufacturing	1.4%
Primary Metals	1.2%
Food Products	1.1%
Refining	0.6%

The data provided by the Travel Promotion Unit also indicate that substantial expenditure increases have occurred in the last few years. As national income and leisure time rise, it is likely that this industry will experience substantial growth, particularly in light of the spectacular natural attractions found in Montana. Natural beauty, a colorful past and effectiveness of the Travel Promotion unit have no doubt been also responsible for the recent upsurge in interest in major film production in Montana.

GOVERNMENT

Employment

State and local government employment in Montana and the nation has increased steadily over the last few years. In general, the rate of increase has, however, slowed somewhat from earlier periods. This growth has not been unique to Montana and was largely the result of the shift in the composition of employment which was discussed earlier. The derivative sector, of which state and local governmen is a part, currently provides numerous new services in addition to many which used to be provided in the home. The point is not to argue the pros and cons of this shift, but merely to suggest that government growth is part of a much larger national economic and social change, in which Montana shares. Tables 7 and 8 provide several yardsticks with which to compare government growth.

Table 7

POPULATION, STATE AND LOCAL GOVERNMENT EMPLOYMENT CHANGE IN MONTANA AND THE U.S.A.

(1965-1975)

	Percent Change (1965-1970)	Percent Change (1970-1975)
State Government Employment		
Montana	32.8%	20.5%
United States	31.4%	19.1%
Local Government Employment		
Montana	5.8%	28.1%
United States	20.1%	18.4%
Population		
Montana	—1.7%	7.8%
United States	4.8%	4.8%

NOTE: Employment data are expressed in terms of full-time equivalent.
SOURCES: Public Employment, U.S. Department of Commerce
Census, U.S. Department of Commerce

Comparisons of growth rates can either be informative or misleading. When analyzing the growth of state or local government employment, the best standard of comparison is probably population growth. As population grows, the demand for public services will also increase. This comparison is more meaningful than a comparison of government with private sector employment, since the latter changes over the course of a business cycle. In addition, a substantial amount of private sector growth has been of a part-time nature, while relatively fewer part-time positions exist in government. Once again, this makes comparisons difficult.

In Montana, state government employment has grown at approximately the national rate since 1965. Since 1970, however, Montana increases have been more consistent with population growth. On the other hand, growth of local government employment since 1970 has been substantially higher than the national average.

In per capita terms the situation is somewhat different. Presently, the per capita employment of state government is comparatively high, while per capita employment of local government in Montana is close to the national norm. For example, in 1975, at state government level, there were 204 state employees for every 10,000 residents, compared to the national average of 129 employees. At the local level, there were 347 employees per 10,000 residents in Montana, compared to 352 employees nationally. Part of the difference in state government concentration, which has existed for years, is related to Montana's low population, rural nature, and large land area. Other states with similar characteristics also have higher than average government employment per capita. State government expenditures per capita, however, do not vary nearly as much as employment per capita. But once again, the less populated states tend to have somewhat higher state per capita expenditures.

Table 8

THE RELATIVE SIZE OF STATE AND LOCAL GOVERNMENTS IN SELECTED STATES.

STATE	POPULATION	FULL TIME EQUIVALENT OF GOVERNMENT EMPLOYMENT PER 10,000 POPULATION		PER CAPITA GOVERNMENT EXPENDITURES FOR FISCAL YEAR 1971	
		STATE	LOCAL	STATE ($)	LOCAL ($)
CALIFORNIA	21,185,000	103	393	326	795
NEW YORK	18,120,000	104	431	343	1106
MICHIGAN	9,157,000	120	350	398	630
NORTH CAROLINA	5,451,000	147	296	265	418
MARYLAND	4,098,000	165	331	376	680
OKLAHOMA	2,172,000	166	314	388	393
OREGON	2,288,000	169	353	419	576
NEBRASKA	1,546,000	170	393	320	507
IDAHO	820,000	182	326	404	417
MONTANA	748,000	204	352	423	473
SOUTH DAKOTA	683,000	169	312	431	438
NORTH DAKOTA	635,000	168	299	465	421
DELAWARE	579,000	244	288	573	475
WYOMING	374,000	208	420	487	610
ALASKA	352,000	379	343	1522	950
UNITED STATES	213,121,000	129	347	350	590

SOURCE: Public Employment, Governmental Finances; U.S. Department of Commerce, Bureau of the Census

Revenue

The other side of the state and local government growth is revenue. As Table 9 shows, the pattern of tax revenue from different sources has changed considerably over the last ten years. All sources have grown but the income tax has doubled as a revenue source for state and local government. Property tax has declined slightly in percentage terms.

Table 9

MONTANA STATE AND LOCAL REVENUE BY SOURCE

	1965		1975	
	Total Revenue in Millions of Dollars	Percent of Total	Total Revenue in Millions of Dollars	Percent of Total
Property taxes	108.5	59.4	232.3	51.0
Sales taxes*	35.6	19.5	69.6	15.3
Income taxes	22.5	12.3	111.7	24.5
License taxes	10.7	5.9	21.3	4.7
Miscellaneous taxes	5.4	3.0	20.6	4.5
TOTAL	182.7	100.0	455.5	100.0

*NOTE: This category includes motor fuel, beverage and tobacco taxes, etc.

SOURCE: Montana Property Taxation 1976, Montana Taxpayers Association.

This shift is consistent with a national trend away from property taxes to income taxes as the ultimate source of revenue for state and local governments. Not only have direct tax revenues shifted to income taxes, but also state and local government have utilized more intergovernmental revenue whose original source was income tax, i.e., revenue sharing. Nationally, local governments have found that taxable valuation has not grown as fast as the cost of governmental services. The income tax, on the other hand, because of the progressive rate structure, has grown faster than inflation. Table 10 shows the differences in average annual growth rates among these variables. By increasing mill levies, governments have raised property taxes faster than the general price level, but income taxes have grown much faster.

A second reason for this shift is that income taxes are perceived as more equitable than property taxes. Notably, Montana has not followed the national trend to greater sales taxes—a source of revenue considered to be among the most regressive.

The issue of revenue estimates, particularly personal income tax collections, is both important and controversial. Revenue estimates are strongly affected by the level of inflation, as well as the general level of agricultural activity.

Table 10
AVERAGE ANNUAL GROWTH RATES, MONTANA
(Fiscal Year 1965-66 - Fiscal Year 1974-75)

	Percent Change
Personal Income Tax Revenue	19.0%
Personal Income	9.0%
Consumer Price Index	5.3%
Taxable Valuation	4.7%
Property Taxes	8.0%

SOURCES: Montana Property Taxation 1976, Montana Taxpayers Association
Montana Department of Revenue
Bureau of Economic Research

A LOOK AT THE FUTURE

The preceding sections have discussed Montana's recent past and prospects for the short-term future. Making statements about the more distant future is an even more hazardous occupation. An economist in 1965 looking at the relative stagnation of the state would hardly have predicted net inmigration in the early seventies. Any overall projection of population and employment is really the result of specific assumptions about different industries. If an economist misses badly on the important basic sectors, the corresponding population projections will be in error. The Bureau of Business and Economic Research at the University of Montana recently issued an excellent review of past projections which were corrected for some of the obvious mistakes in coal mining employment.[8] The purpose of this section is to provide a new set of projections that are based on more current economic information and compare them withpast work.

The new projections are the result of an economic modeling effort (the Montana Futures Process) undertaken in the last year by Montana state government. The model represents a systematic study of the relationships among numerous variables within the Montana economy. Given various assumptions about the type and level of industrial development, the model produces an estimate of employment and population for future years.

At this point in time, one major uncertainty in the state's outlook is the level of coal production and energy conversion in the future. The Montana Energy Advisory Council has provided two levels of possible development for 1980 and 1985. The low scenario features 37.5 million tons of coal production for 1980 and 43.5 million tons for 1985. Coal conversion plants are Colstrip I-III for 1980, and Colstrip I-IV for 1985. The higher level of activity assumes that 56.5 million tons of coal will be mined in 1980 and 66.1 million tons in 1985. The high level of energy conversion includes Colstrip units I-IV in 1980, and for 1985 assumes phase one of the Circle West project as well as an additional 600 megawatts of electrical power.

Table 11 summarizes the employment and population effects of these two levels of energy-related developments and compares these projections with older sources. The interesting feature of the table is the great

[8]Polzin, Paul E., "Employment Projections For Montana To 1985," Montana Business Quarterly, Winter 1976, pp. 17-24.

Table 11
A COMPARISON OF FORECASTS

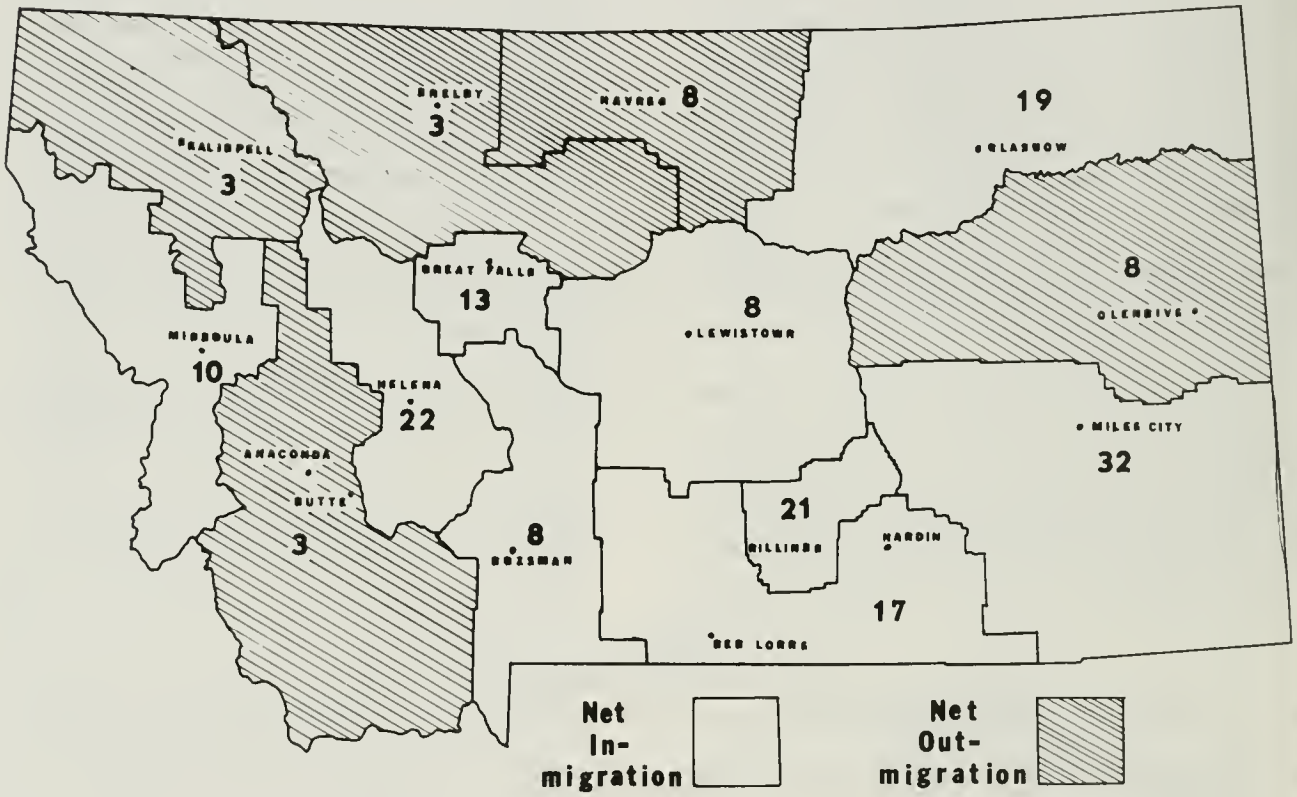
	Predicted Level	
Employment 1975 level = 293,000	**1980**	**1985**
OBERS 'E'	277,200	280,900
Montana Economic Study (1970)	277,600	N/A
NPA	285,200	292,600
Low Scenario (Montana Futures Process)	331,259	355,666
High Scenario (Montana Futures Process)	333,041	358,142
Population (1975 level = 747,500)		
OBERS 'E'	669,700	667,100
Montana Economic Study (1970)	725,000	N/A
Low Scenario (Montana Futures Process)	795,335	838,500
High Scenario (Montana Futures Process)	799,595	844,174

NOTE [1]The OBERS, MES, and NPA employment figures were adjusted by Dr. Polzin in the previously cited article to be comparable. A description of these projections, including the adjustment technique, is found in the original article.
[2]All employment figures in the new set of projections have been adjusted to fit the census definition used in other studies. The new set of projections relies on Department of Commerce data where the employment definition and coverage varies slightly.
[3]OBERS refers to Office of Business Economics and Economic Research Service.
NPA refers to National Planning Associates.

difference between the new set of projections and the past set. All of the previous studies failed to predict the great increase in derivative activity experienced within the last few years. The new projections are based on the most current data available on employment structure and population changes. As a result, the projections are higher and presumably more realistic.

Figure 7 explores the regional aspects of the growth under the low energy scenario for 1985. The percentages increase in population is given along with an indication of the direction of migration. This migration estimate is based on a comparison of the expected population with the number that would result from natural increase from 1975 to 1985, i.e., births minus deaths. In general, the urban and energy impacted areas will have net inmigration, the rural ones will continue to suffer net outmigration. Kalispell shows outmigration on the basis of economic consideration. However, in the past, its growth has not been totally explained by employment growth, either. So, if non-employment related inmigration continues, Kalispell may very well continue to experience net inmigration in the future.

fig. 7
PERCENTAGE CHANGE IN POPULATION
1975 to 1985



SOURCE: Montana Futures Process, Department of Community Affairs, Research Division.

The long-term outlook for Montana is roughly a continuation of the course it has taken over the last five years. Basic industries will grow very slowly, while derivative activity will grow much faster. The state should continue to see the slight inmigration it has experienced over the last five years.

It must be emphasized that these projections are the result of specific assumptions about the basic industries in Montana. In order for the state to continue to hold its own and not lose population by net outmigration, its primary industries must at least remain stable. Since agriculture will continue to lose workers as it has in the past two decades, other basic industries must take up the slack. In the last five years, coal and petroleum-related industries and the federal government have done so and, in the future, these industries and some mineral-related activity may well continue to provide the necessary economic base. An unexpected decline due to outside forces in any basic industry could, of course, cause these projections to be badly off the mark.

CONCLUSIONS

What, then, is the direction of Montana's economy? The economy has been expanding rapidly since 1970 with increases in employment large enough to halt the high levels of net-outmigration which the state experienced throughout the two previous decades. Simply stated, employment increases have kept pace with population growth. This is obviously a very healthy sign for Montana's economy.

Although most of the new jobs have been in the service and trade sectors, income has steadily increased. This derivative expansion has not been unique to Montana but has been true for the nation as well. However, in order for this expansion to continue, the main sources of Montana's income and employment, the resource industries, must remain healthy. Since the future of the dominant industries is largely determined by external forces, public and private decision makers must carefully assess national policies which will determine the success or decline of their industries.

Many crucial trade-offs will exist in the future. For example, a national farm policy which would benefit Montana would necessitate higher food prices, and would be met with resistance nationally. Timber cutting and mining policies are even more complex when environmental costs are weighed. No simple solutions exist in such complex situations, but Montanans should insure that their input is made known to national decision makers when the health of the vital basic industries is at stake.

II
Montana Futures: A Survey of Citizen Choices

INTRODUCTION

The Montana Futures Study was initiated by Governor Judge to provide for public input into policy and planning alternatives for the future of Montana. This opportunity to have a direct voice in shaping the future of Montana at the administrative level of state government is intended to bring the people closer to their government and to improve overall quality of life.

The public survey portion of the Futures Study was contracted by the Statistical Center at Montana State University under the direction of Dr. Kenneth Tiahrt. This survey was designed to provide an initial broad identification of issues which residents of Montana feel are most important. It also provides general information concerning the public perception of various branches of local, state, and federal government and the sectors in which their responsibilities lie. Exact delineation of some alternatives and the related public posture will of necessity depend on various followup processes. Public hearings or forums, surveys specific to certain areas, occupations, or ages, etc. will be useful in providing continuing detailed public input.

SAMPLE FRAME AND METHODOLOGY

A statewide randomly drawn sample of 5100 persons received the questionnaire by mail. The sample was drawn from the list of private individuals owning motor vehicles in Montana. The questionnaire was constructed with the aid of various departments in state government and university specialists from social, biological, and physical sciences. The principal reference for areas of interest was Governor Judge's 1975 State of the State address.

A reminder postcard was mailed to all 5100 persons ten days after the initial mailing of the questionnaire. Over 1500 responses were received with an overall return rate of almost exactly 30%.

An indication of how well the sample represents the entire statewide population may be obtained by comparing demographic characteristics of the sample to available census data for the state. Throughout this report sample results are reported for males as solid columns and for females as outlined columns. In each case the sample percentage of respondents for a given category of response is given at the top of each column. The identification system to the left of each graph may be matched to the questionnaire reprinted in appendix A. Greater numbers of males than females completed the survey questionnaire; however, the geographic distribution of both males and females responding was very good. The following table shows how closely the survey responses followed the geographic distribution of the state population. It also indicates that approximately 3/4 of the respondents in each region were male.

Table 12

	District				
	1	2	3	4	5
Population as a percent of the state total	13	21	19	24	22
Percent of survey responses from district	13	17	22	25	23
Percent of males responding from district	12	18	22	24	24
Percent of females responding from district	15	15	22	26	22
Percent of males responding on survey	74	80	77	76	78
Percent of females responding on survey	26	20	23	24	22

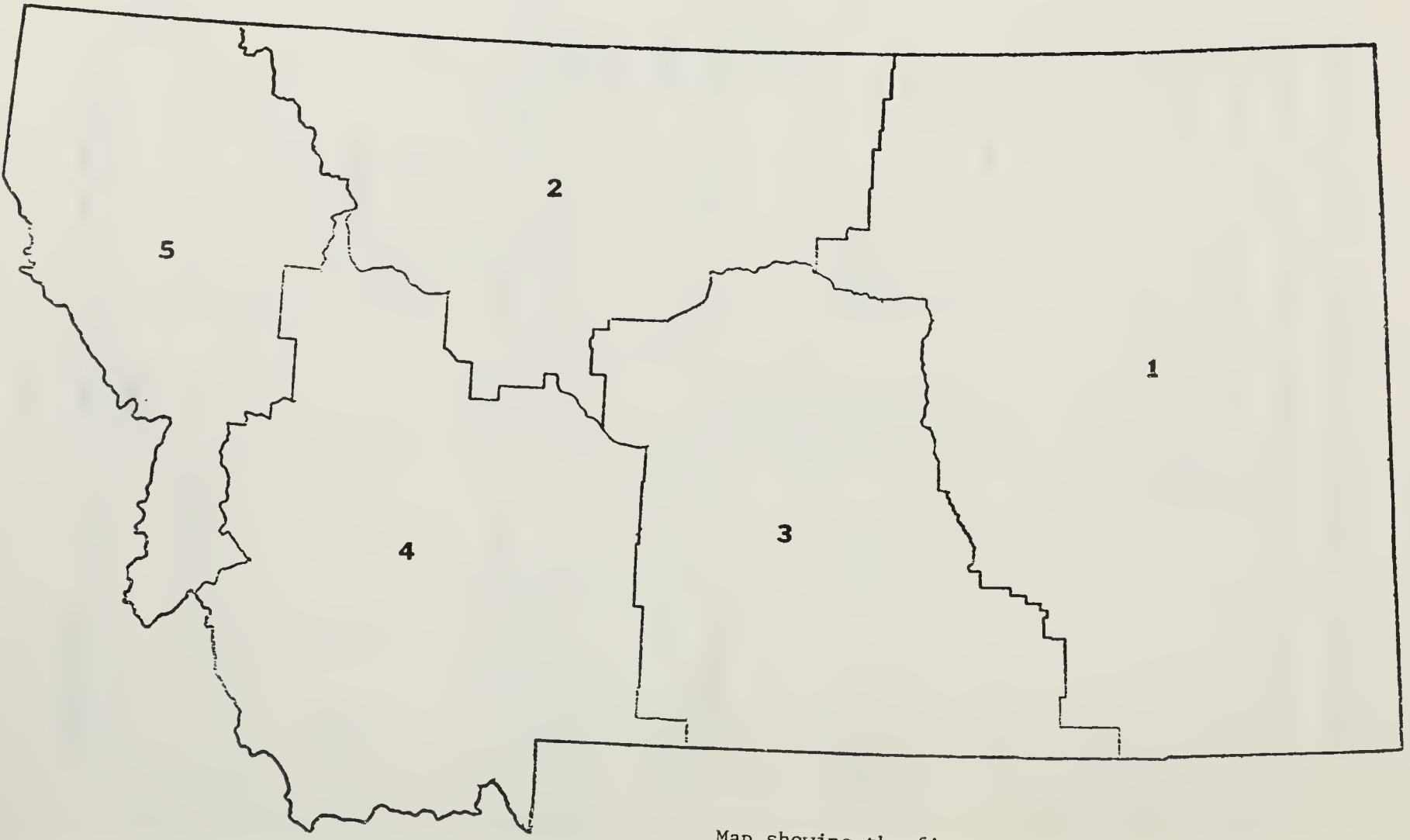
Survey figures show a larger percentage of suburbanites than is given by 1970 census figures. However, census designations for suburban areas are very restrictive and may not match the public definition of Montana residents.

Table 13

	Urban	Suburban	Rural
State	46	7	47
Survey	39	18	43

Data is in percent of total.

Map 1



Map showing the five state planning districts.

Within each district, the survey percentages are as follows:

Table 14

	District				
	1	2	3	4	5
Urban	29	44	45	50	26
Suburban	11	14	21	14	26
Rural	60	42	34	36	48

The total state population is 694400 of which 63% or 437500 persons are 18 years of age or older. Persons in the 26-45 year age group and those 66 and older were correctly represented in the survey. Young adults (18 to 25) were somewhat under represented, and mature adults (46-65) were similarly over represented.

Table 15

	Age Group			
	18-25	26-45	46-65	66 and older
State	19	35	32	14
Survey	8	37	42	13

Census figures do not record occupations by classification which allow for comparisons with the survey or are particularly meaningful for the information desired. The occupational classifications and responses of the survey do, however, give a good picture of the various occupations pursued by Montanans and the extent to which each group was represented in the survey.

Table 16

Occupation	Percent of survey responses
Housewife	10
Student	3
Retired	16
Labor	14
Agriculture	16
Business	13
Government	6
Professional and Technical	19
Forestry, Mining, and Natural Resources	3

SAMPLE RELIABILITY AND CONFIDENCE LEVELS

The responses to the survey have been summarized in numerical values as percentages which reflect the viewpoint of the statewide population. These numerical values are only estimates of the true state of nature and do not give completely precise information about the entire population.

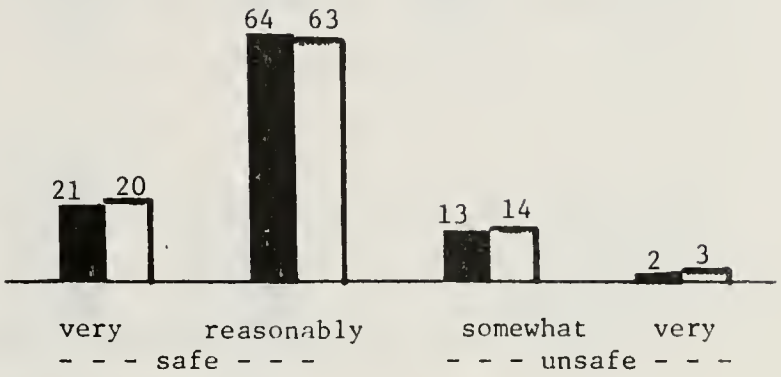
When it is reported that a certain percentage of persons responding to the survey favor a certain issue, the immediate concern is how closely this sample value is to the true (but unknown) real world value. For the Montana Futures Survey a statistical analysis of the total number of respondents and the possible percentages was conducted. This analysis indicates that about 95 out of 100 times, the reported percentage for the entire sample or for males will differ from the true population value by no more than 3%. For females alone this failure to match the true state of nature will be less than 5% since fewer women responded.

This report should be read and interpreted with these measures of precision in mind. Thus if more than 53% of the sample respondents favor a certain issue, one can be nearly certain that the entire population would favor the issue. Of course a higher sample estimate indicates a larger majority in the population. When two estimates are nearly equal, the results are "too close to call", meaning that the actual population difference is so small that the sample will not detect it with certainty.

Persons in Montana generally feel safe from criminal actions in their surroundings.

fig. 8

How safe do you feel



No significant differences were observed in feelings of safety for urban, suburban, or rural residents although rural people felt slightly more safe. Elderly persons (over 65) exhibited a greater tendency to feel somewhat unsafe than did younger individuals although the difference was not significant.

In a manner characteristic of the western frontier, over 75% of the Montanan's surveyed gave high priority to "quick and sure punishment, including capitol punishment" as a criminal correction method. They also overwhelmingly considered longer jail sentences to be an important measure in dealing with future crime rates. Equally large numbers of respondents rated gun control as not important. Responses related to methods of dealing with future crime rates have been ranked below in order of priority. In addition to longer jail sentences, consolidation of law enforcement units and hiring more enforcement personnel were considered to be important counter-measures for rising crime rates.

fig. 9

Longer jail sentences

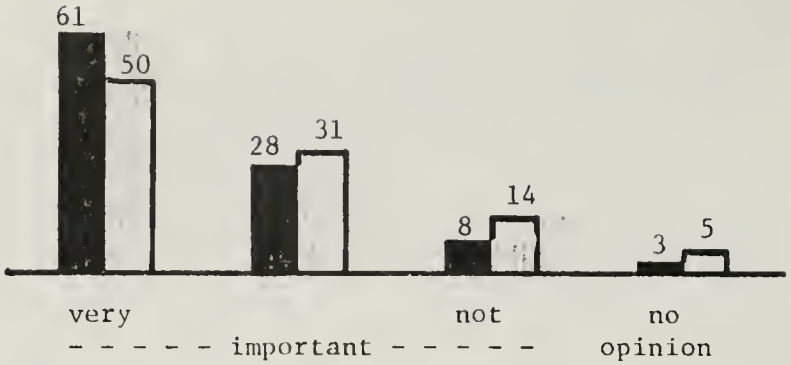


fig. 10

Consolidate law enforcement

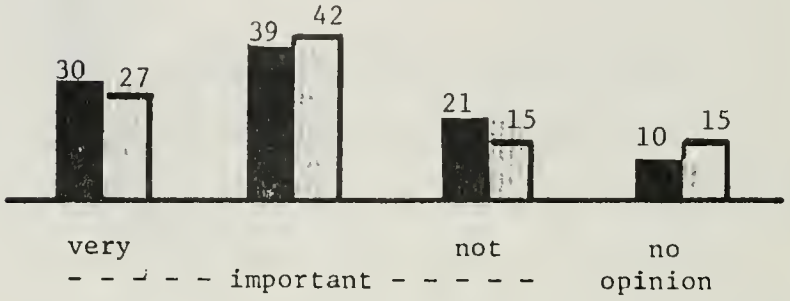


fig. 11

Hire more personnel

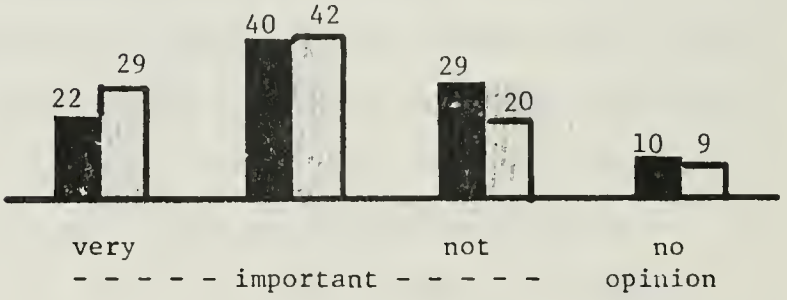


fig. 12

Decentralize penal system

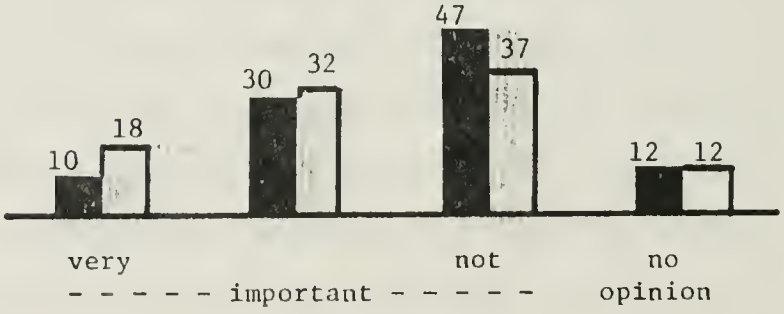
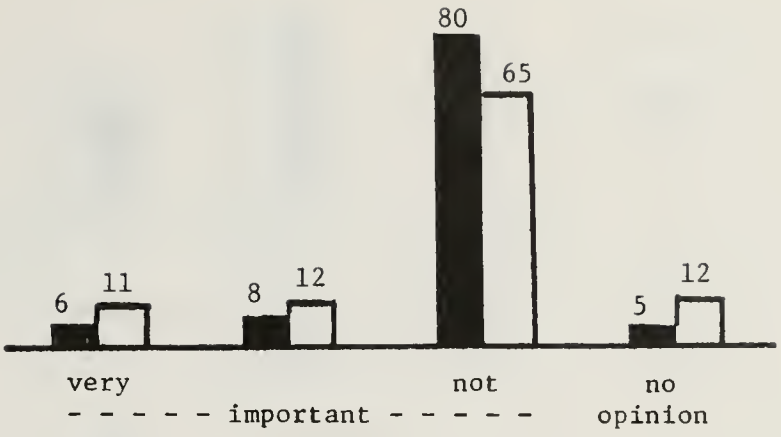


fig. 13

Strong gun control



Correctional strategies for treating criminal offenders show a wide range of responses. A distinct change from high to moderate priority occurs between third and fourth ranked strategies below. Ranking was accomplished by using simple weighted scores.

fig. 14

Quick and sure punishment

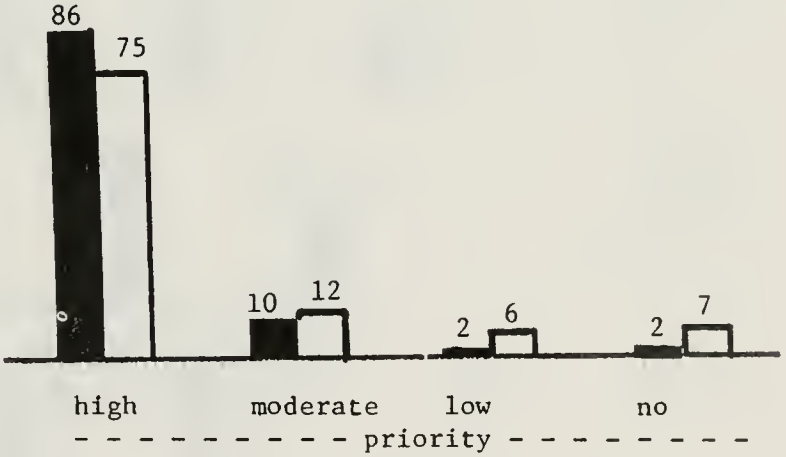


fig. 15

Reduce social causes

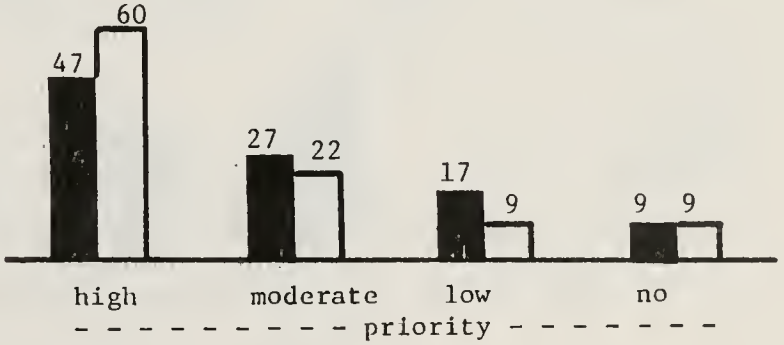


fig. 16

Repay victims

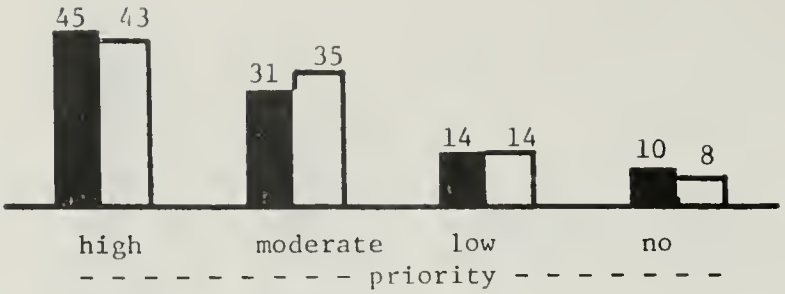


fig. 17

Help offenders adjust

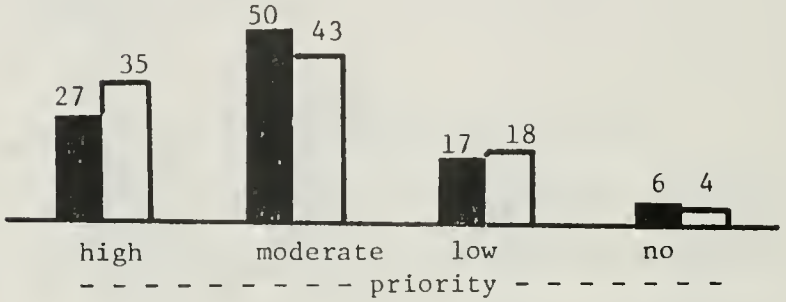


fig. 18

Educate offenders

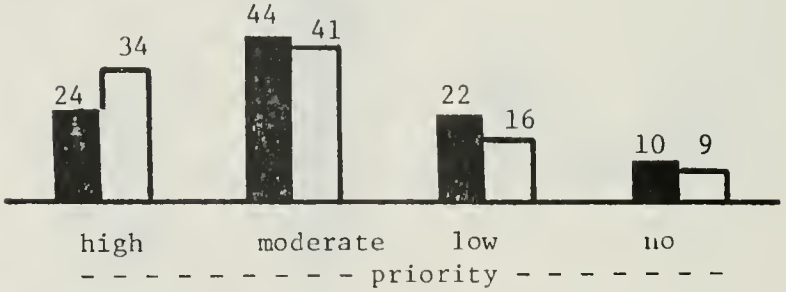
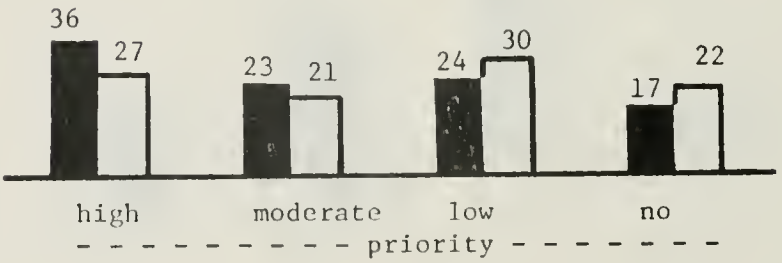


fig. 19

Isolate violators



Provision of health clinics and subsidies for medical doctors in rural areas by the state is favored by women and rejected by men when examined on a statewide basis. It might be expected that rural persons would favor these items more than urban and suburban; however, this was not the case. This lack of interest is perhaps due to the independent nature of rural residents and their disdain of a program which might appear to them to be a form of welfare.

fig. 20

Provide health clinics

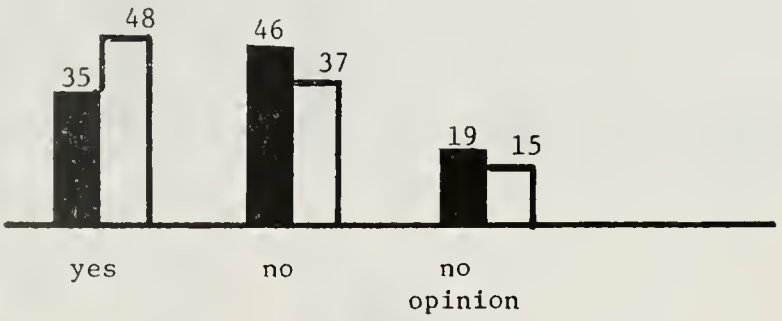
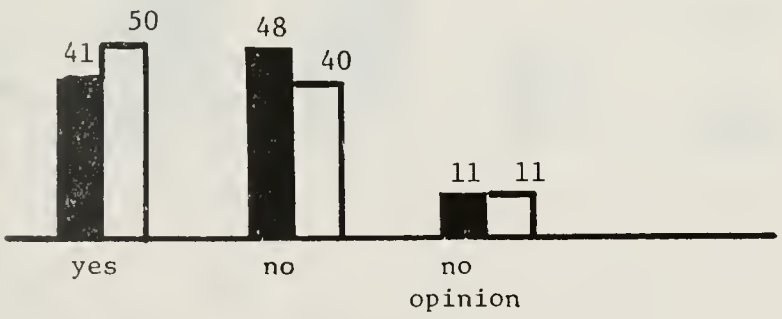


fig. 21

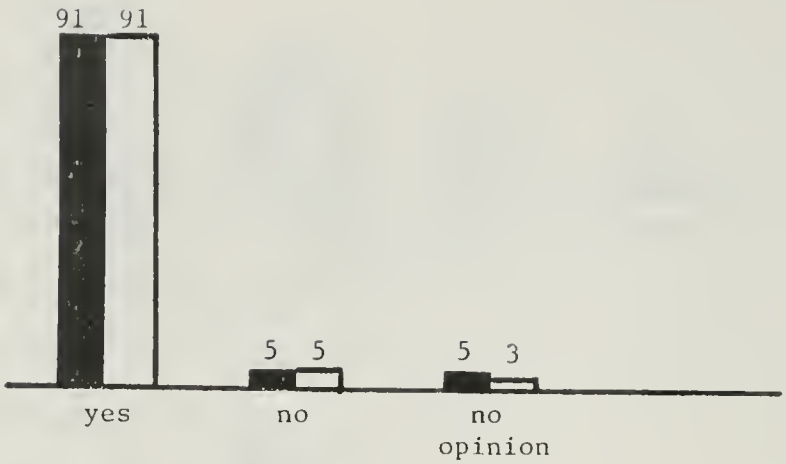
Subsidize medical doctors



Nearly everyone believes that emergency vehicles should be manned by persons trained and certified in emergency medical procedures. This medical service benefits all sectors of society and existing services receive a great deal of public visibility.

fig. 22

Have certified medical training



All programs for the treatment of mentally ill or incompetent persons were supported as priority items except for institutionalization. Possibly this represents only an attunement to current social trends. Further explanation of a committment to these programs should include information concerning cost comparisons, success rates, etc.

fig. 23

Community services

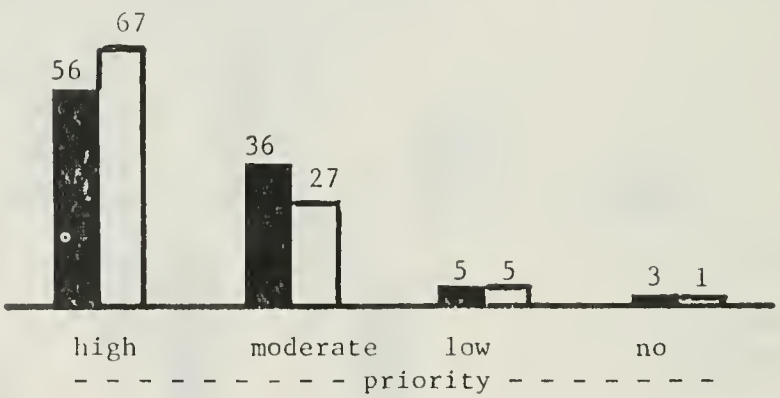


fig. 24

Educate incompetent

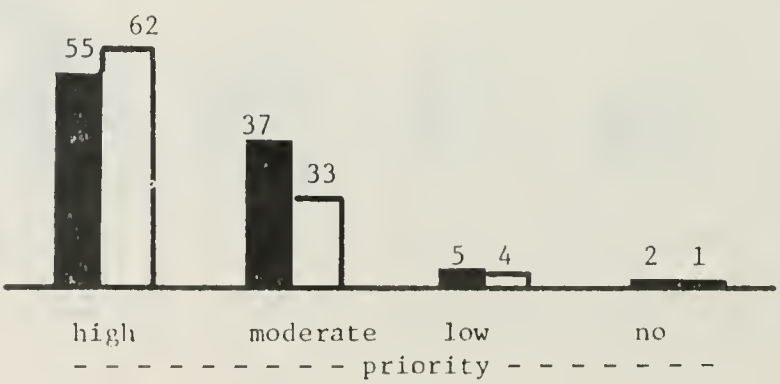


fig. 25

Guidance programs

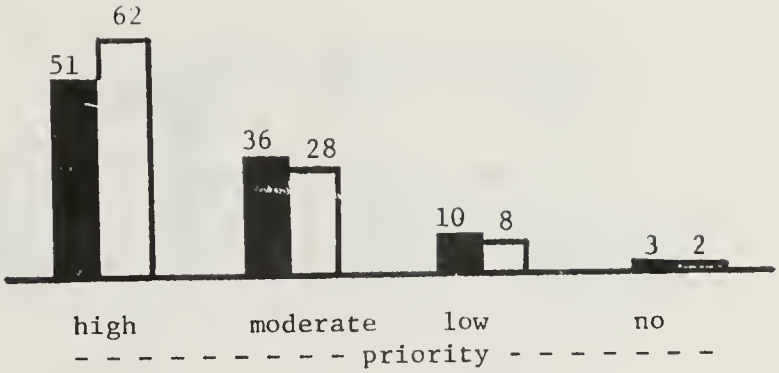


fig. 26

Prepare communities

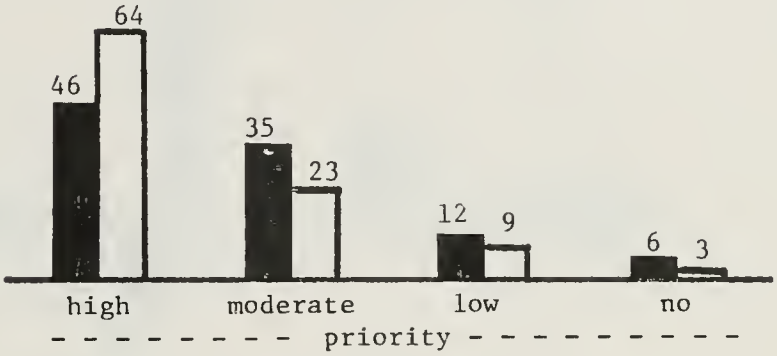
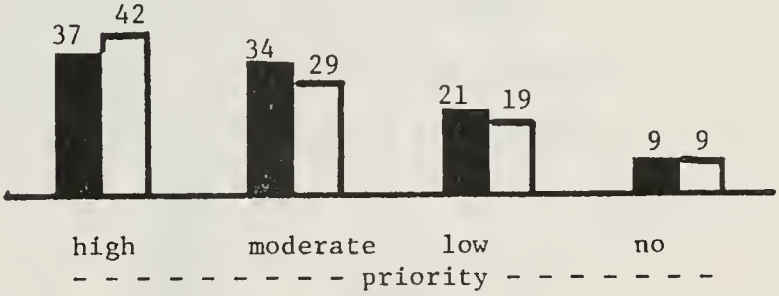


fig. 27

Institutionalize persons

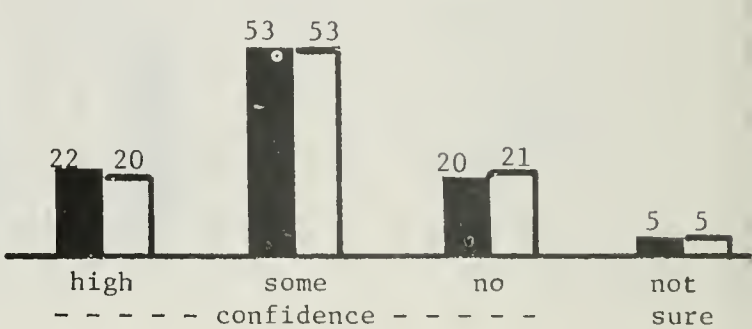


GOVERNMENT AND COMMUNITY AFFAIRS

Most people have confidence that governmental units fairly represent their interests; however, there are some subtle and interesting differences in ratings. Overall the Governor inspires the greatest confidence, and this may be due (at least in part) to the survey itself which has been proclaimed as an instrument to provide the citizen a voice in Montana's future.

fig. 28

The Governor



County and city governments and the state legislature are very similar, possibly because they are generally well known to and dependent on relatively small constituencies.

fig. 29

County government

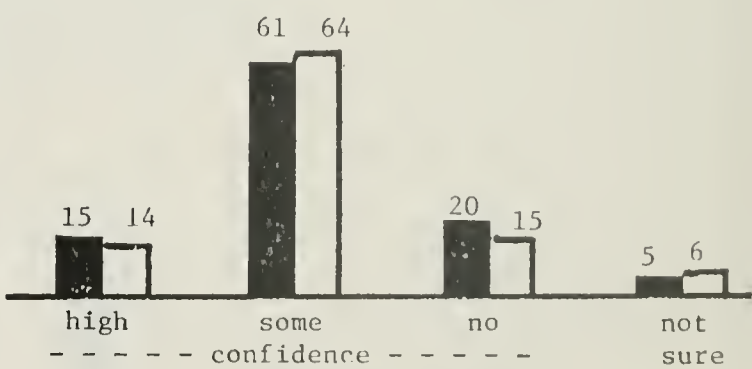
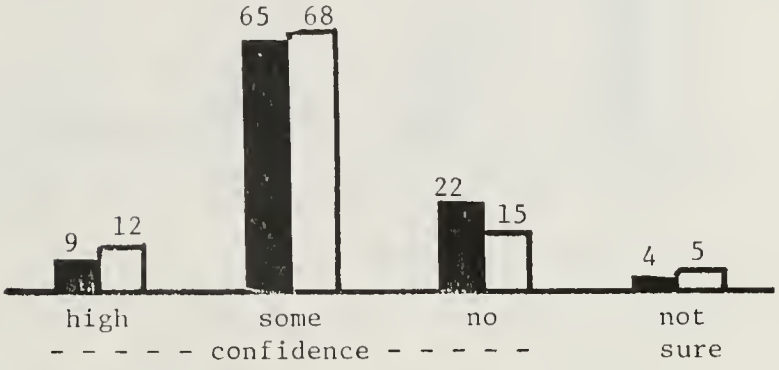


fig. 30

City government

fig. 31

The state legislature



State courts and agencies received somewhat lower ratings, and this could be expected based on their relative isolation from the feelings and desires of the public.

fig. 32

State courts

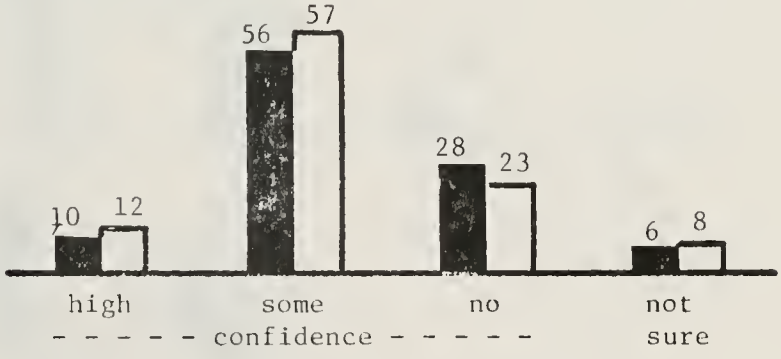


fig. 33

State agencies

Montanans clearly feel that legislators should give high priority to the opinions of their constituents. Use of a legislator's best judgement is a very poor second followed by the advice of special interest groups. Only rarely should party leaders be followed in voting on legislation.

fig. 34

Opinions of the people

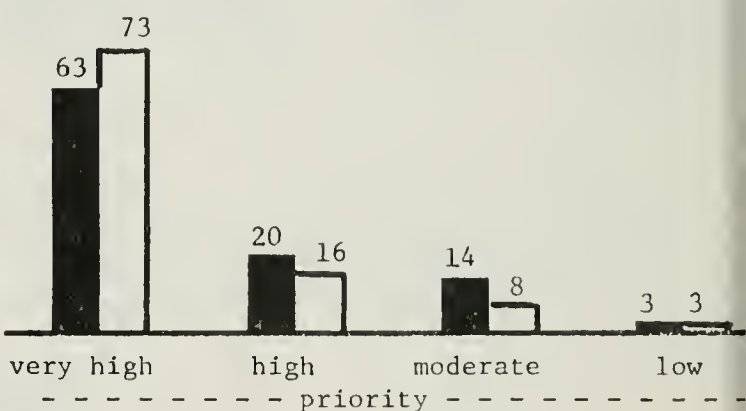


fig. 35

Judgment

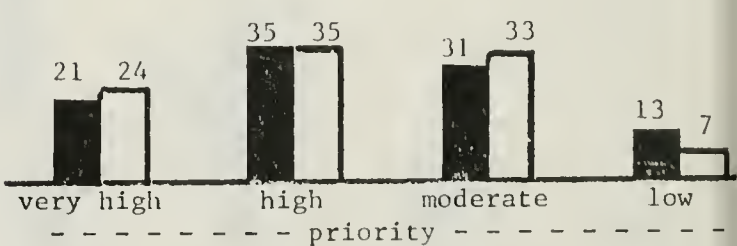


fig. 36

Interest groups

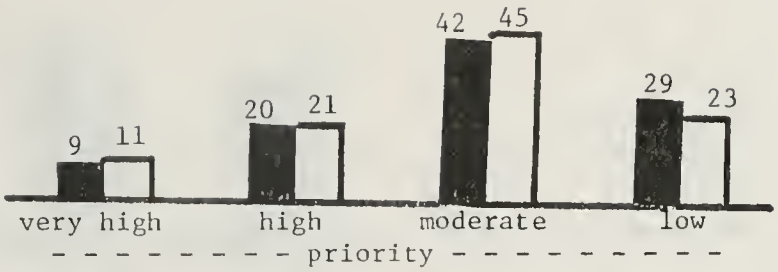
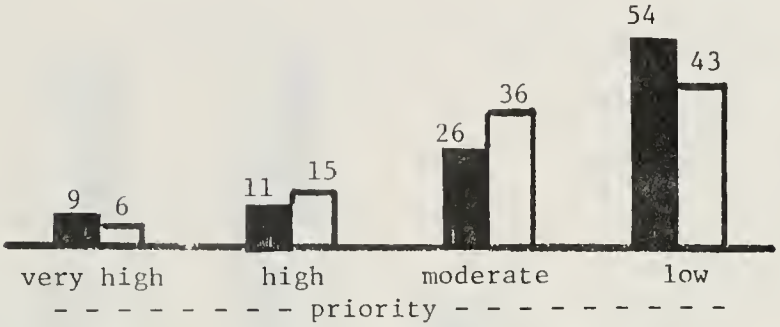


fig. 37

Party leaders



The Montana public prefers tax breaks to business over make work programs as a means of reducing unemployment. There is no consensus for or against creating a state land use agency or for mandatory city and county planning.

fig. 38

Tax breaks to private businesses

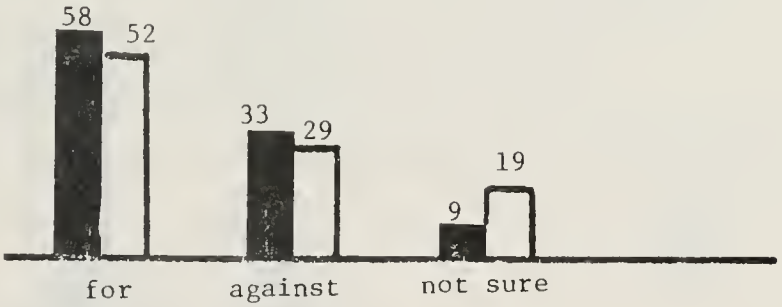


fig. 39

Temporary public jobs

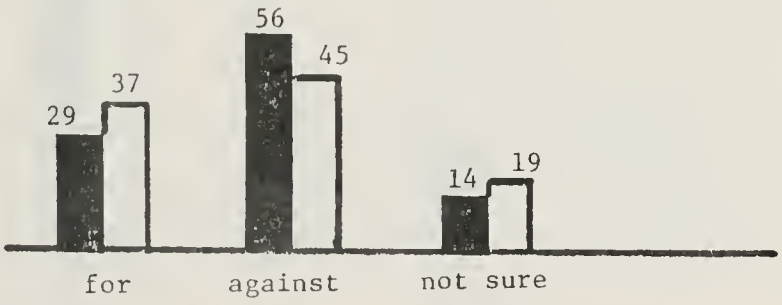


fig. 40

Create state land use agency

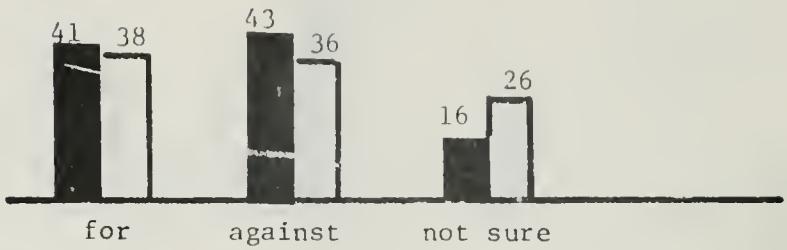
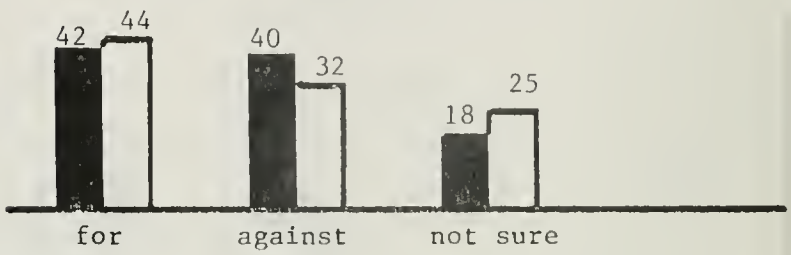


fig. 41

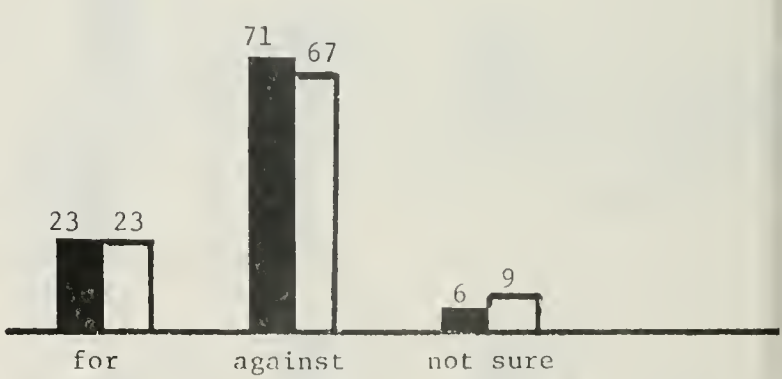
City county land use planning



A strong 3 to 1 opposition to a state sales tax was indicated by the respondents. This is a strong historical stand and may be only an indication of a lack of comparative information on alternatives. Possibly public input on selective sales taxes on certain goods or services should be sought as well.

fig. 42

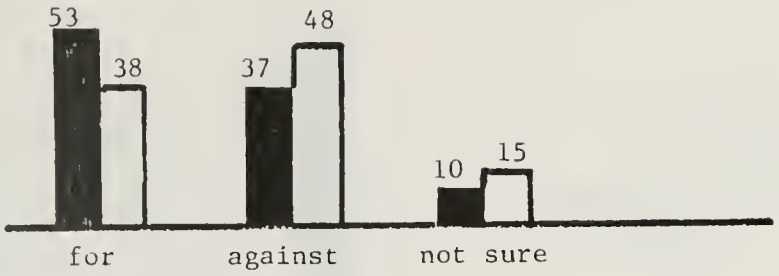
State sales tax



Statewide, public access bills are favored but with less enthusiasm in regions 1 and 5 than in the other regions.

fig. 43

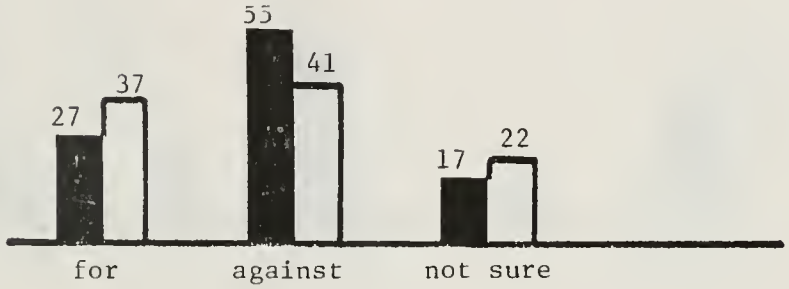
Public access for recreation



Montanan's are opposed to state supported public television.

fig. 44

Public television



In general, a preference for higher taxes over reduced services was expressed first for law enforcement and secondly for road construction and maintenance. Region 1, however, gave first priority to roads. There was virtually no such preference expressed one way or the other for higher education, health, and social services. Reduction of services was prefered over raising taxes for recreational purposes.

fig. 45

Law enforcement corrections

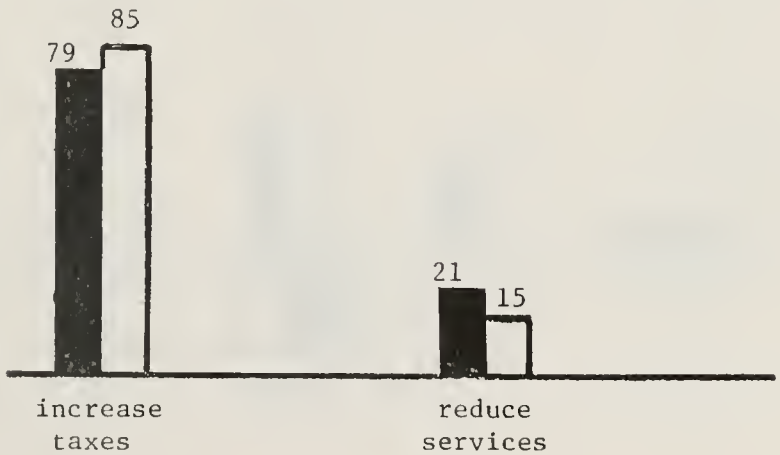


fig. 46

Road construction maintenance

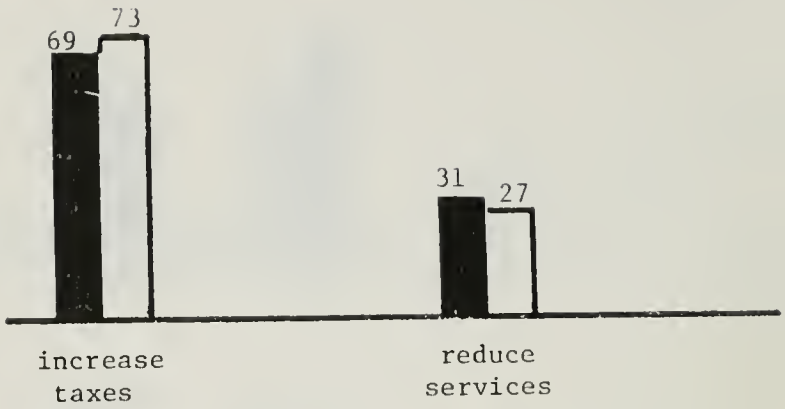


fig. 47

Higher education

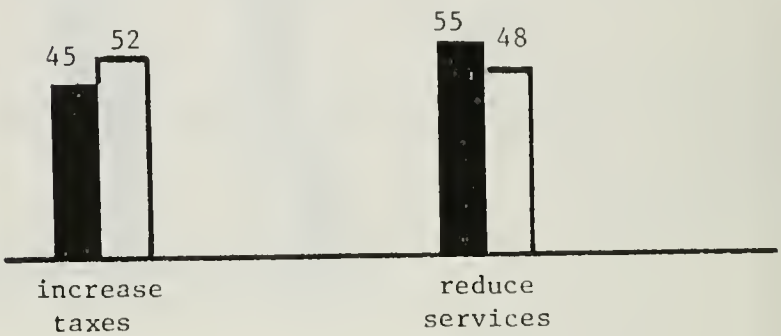


fig. 48

Social health services

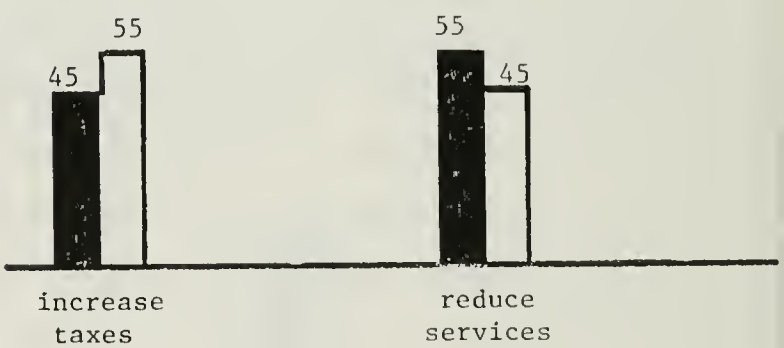
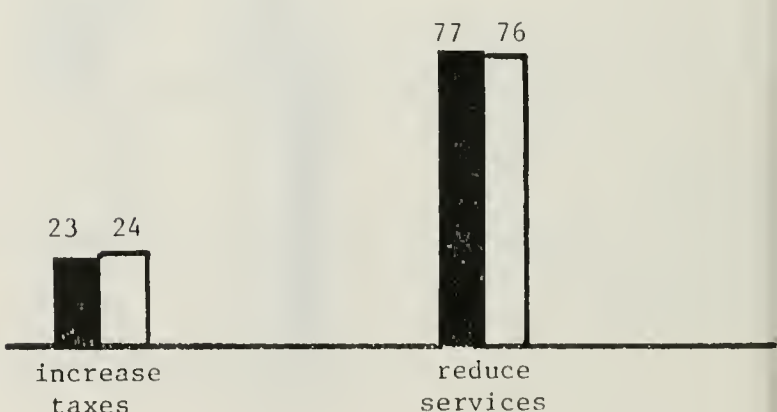


fig. 49

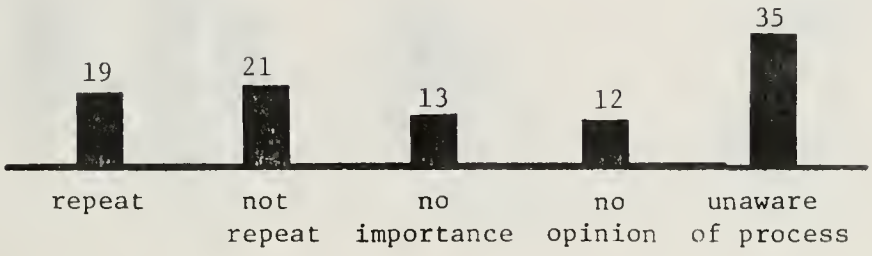
Recreational facilities service



About 1/3 of the respondents were unaware of the voter review process and less than 19% feel it should be repeated. In general, the responses indicate that it was not well received and would probably not need to be repeated for a long time.

fig. 50

Voter review process



Priorities for financing local transportation needs with state funds were, in general, ranked in the following order: 1) arterial highways, 2) rural roads, 3) buses, 4) airports, and 5) bikeways. Region 1 gave higher priority to rural roads than did the other regions. Use of local or federal funds would of course not necessarily follow this same ordering.

fig. 51

Arterial highways

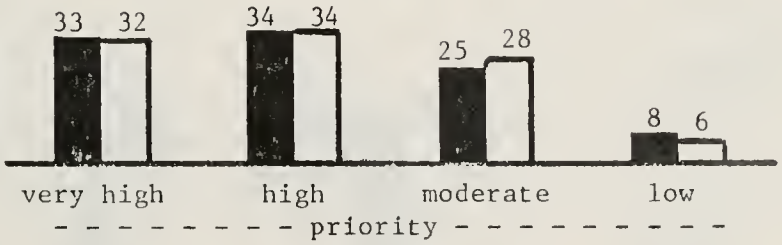


fig. 52

Rural roads

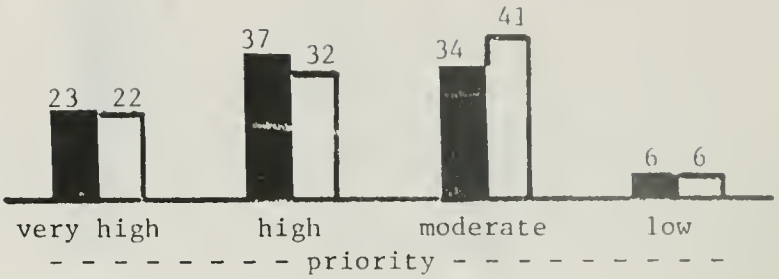


fig. 53

Local mass transit (buses)

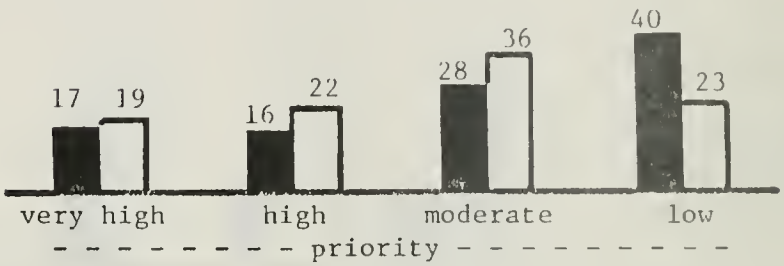


fig. 54

Airports

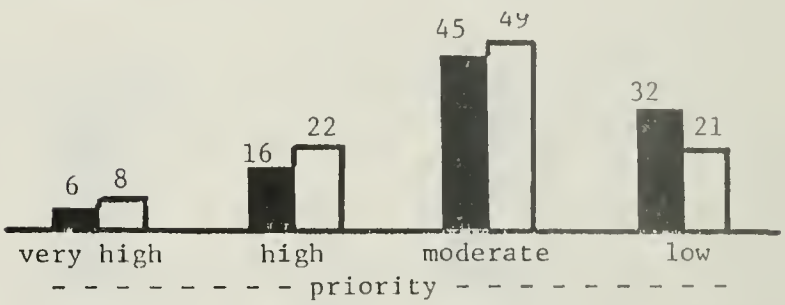
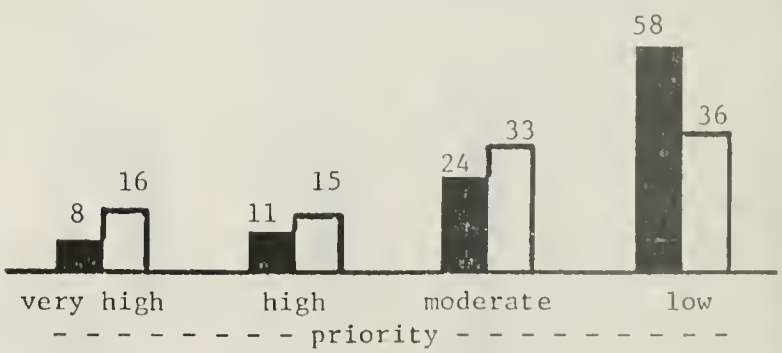


fig. 55

Bikeways



Priorities on tax support for public services rate police and fire protection first; health and sanitation second; library, parks, and recreation third; and welfare a low fourth. There appears to be a strong sentiment in Montana against welfare expenditures.

fig. 56

Police protection

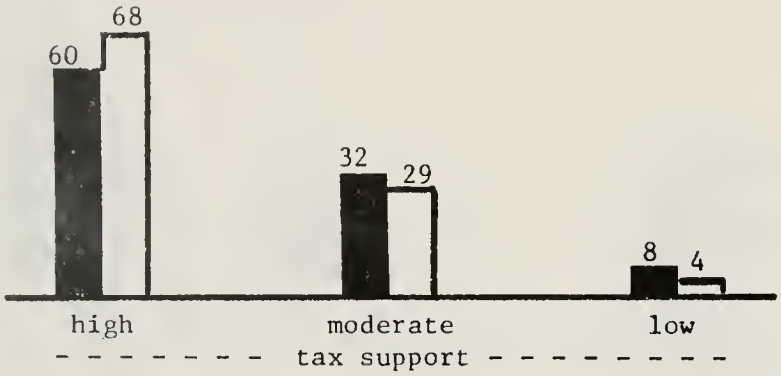


fig. 57

Fire protection

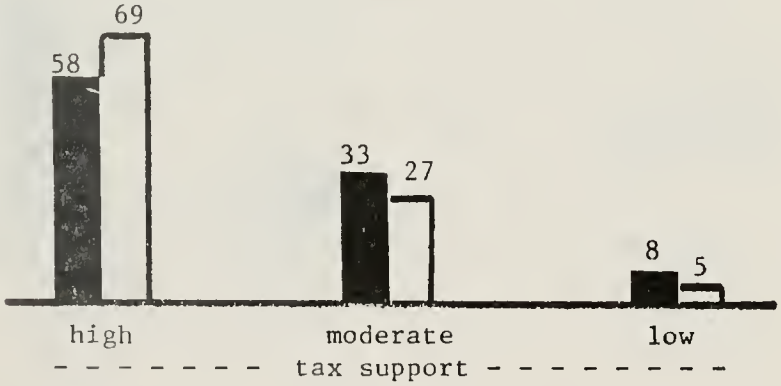


fig. 58

Health services

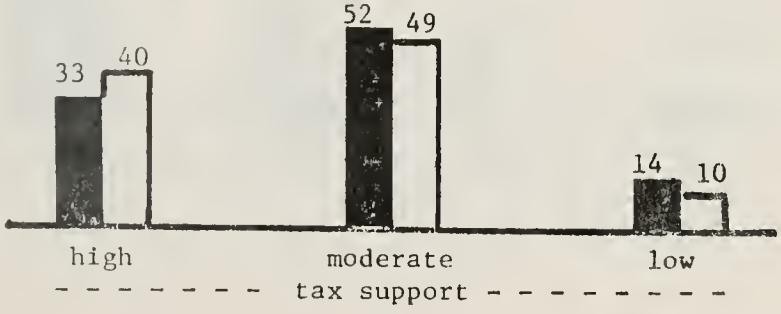


fig. 59

Sanitation services

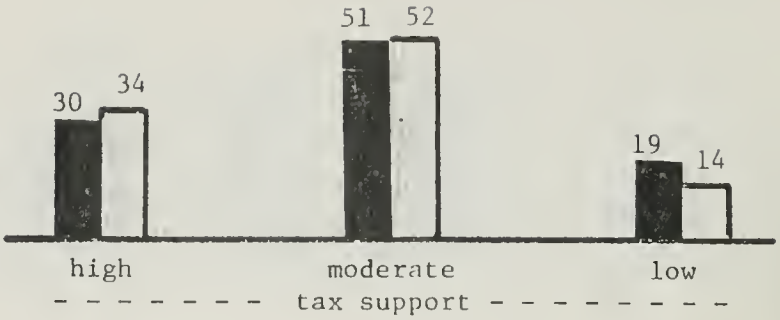


fig. 60

Library

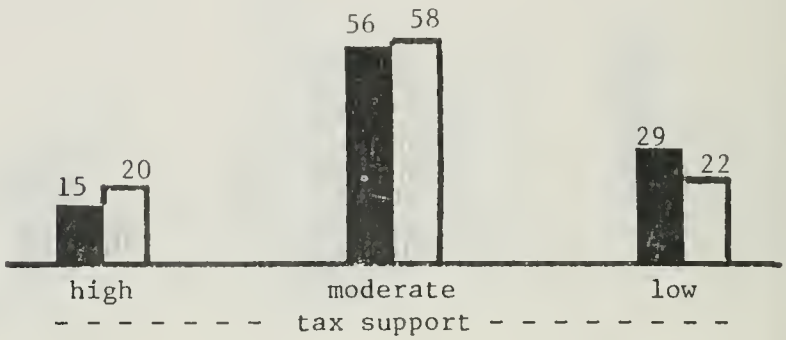


fig. 61

Parks and recreation

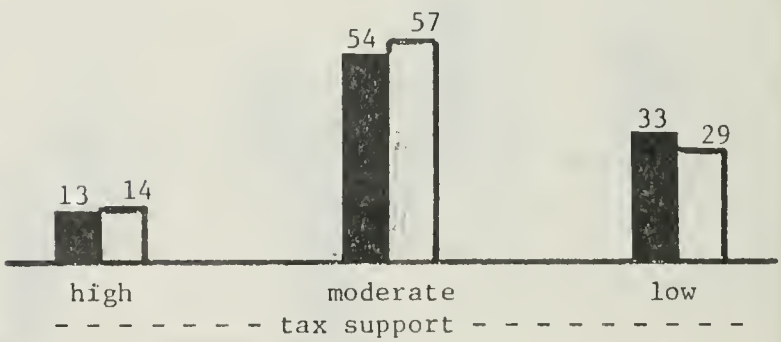
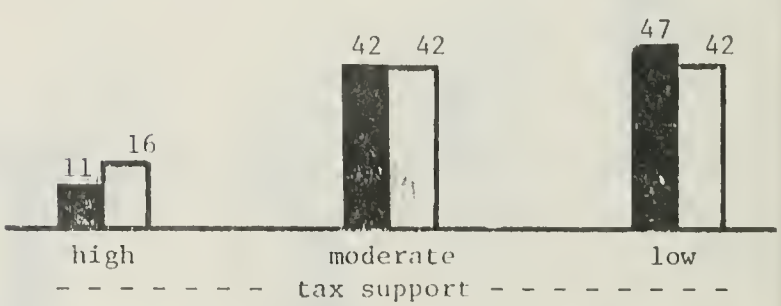


fig. 62

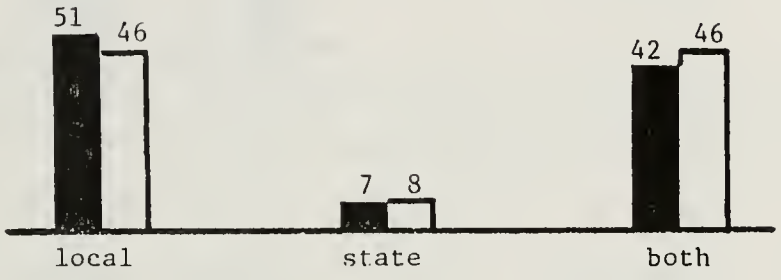
Welfare



Nearly equal numbers of people feel that, for controlling community problems, the balance between local and state control is about right or there should be more local control. Almost none favor expanding state control, which is consistent with low confidence expressed earlier in state agencies.

fig. 63

Balance between state and local government



In allocating federal aid to various programs, law enforcement and highways continue to receive high priority as they did for local funding. Education and conservation were rated higher than public employment and social services; recreation was rated quite last. Region 1 again gave higher priority to highways than did the remainder of the state.

fig. 64

Law enforcement correction

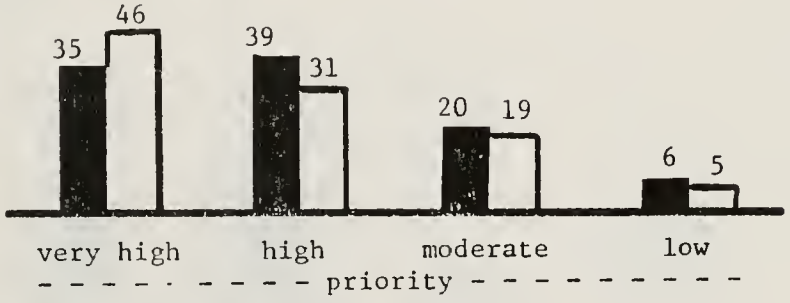


fig. 65

Highway construction maintenance

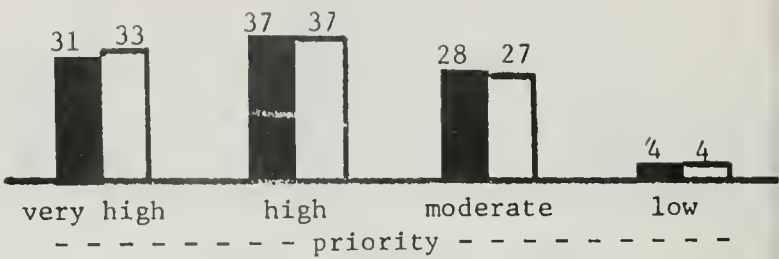


fig. 66

Public education

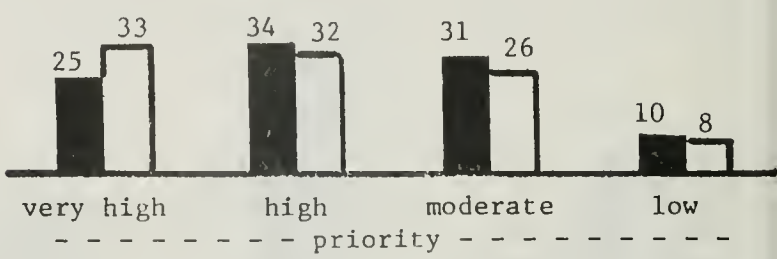


fig. 67

Conservation and resource development

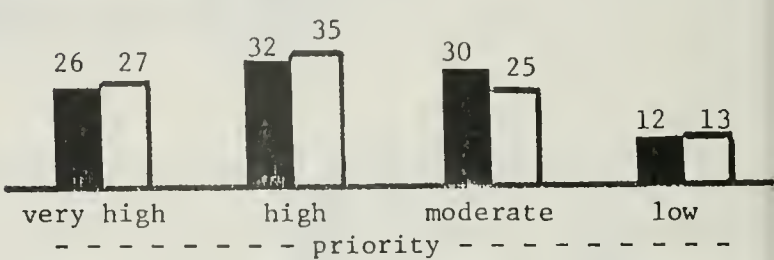


fig. 68

Social health services

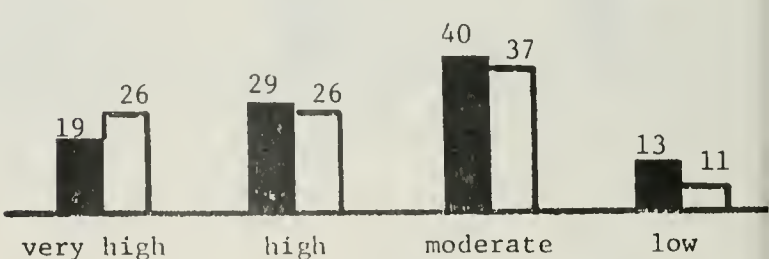


fig. 69

Public employment

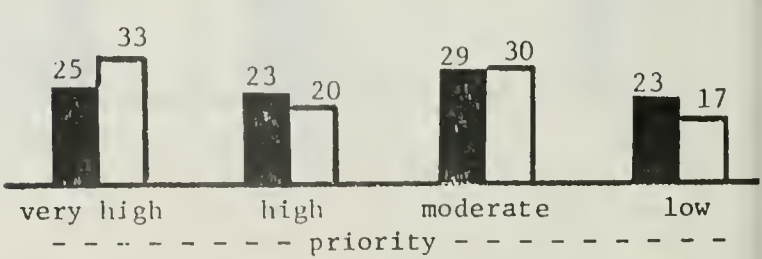
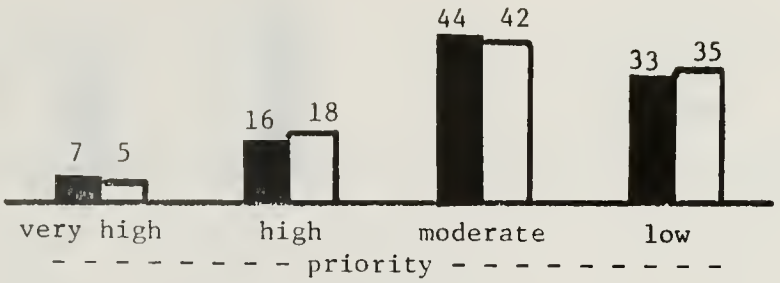


fig. 70

Recreation



Local government is favored for having responsibility for law enforcement, land use, and health and welfare. Region 5 favored this as applied to land use more strongly than did the other regions. State government is favored for responsibility for natural resource management and also for highways and roads. There is very little support for giving federal government major responsibility in these areas.

fig. 71

Law enforcement

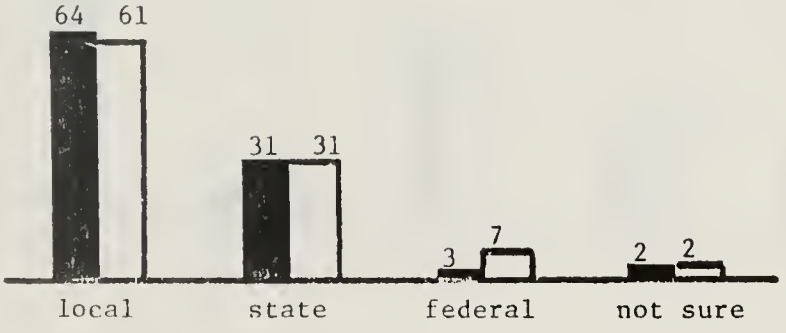


fig. 72

Land use planning and control

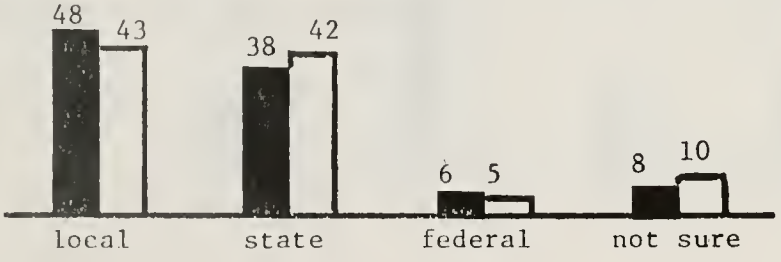


fig. 73

Health and welfare

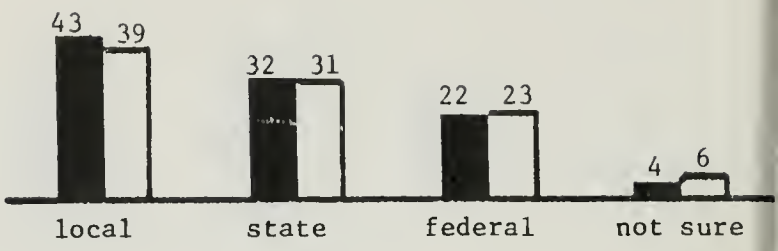


fig. 74

Natural resource management

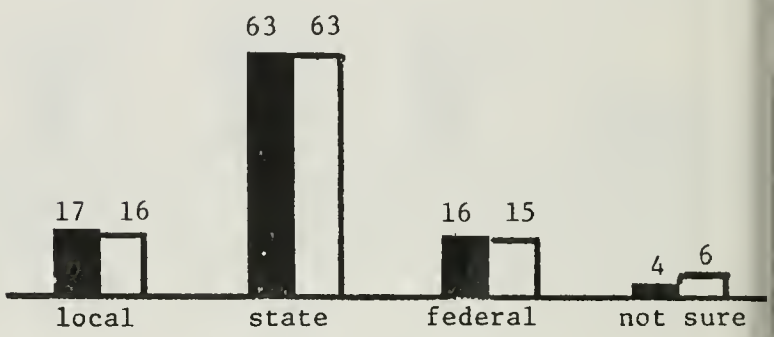
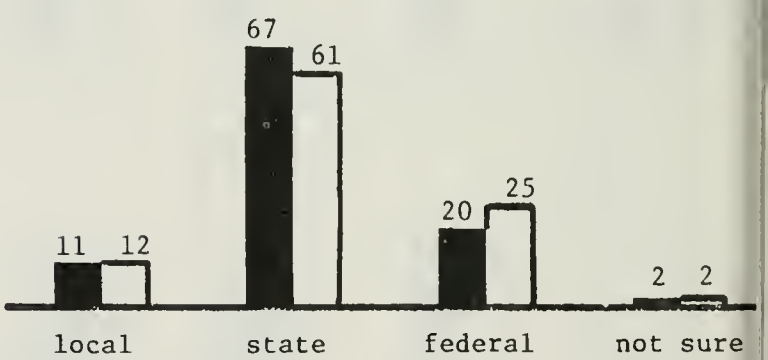


fig. 75

Highways and roads



HIGHER EDUCATION

The University system is rated as performing average or above in each of the areas in which it functions by well over half the respondents. Region 1 gave higher performance ratings than did the other regions, and the response from women in region 2 shows they desire more continuing education and community programs.

fig. 76

Instructing students

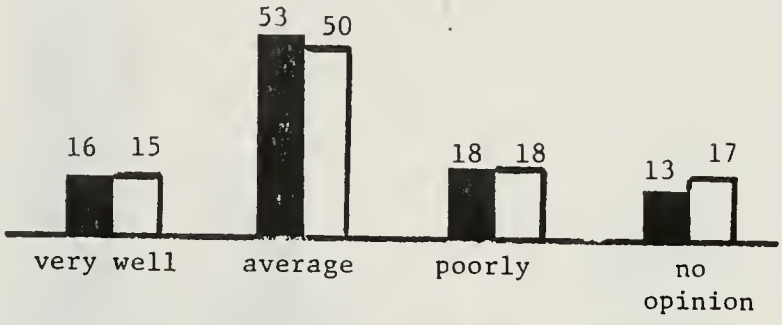


fig. 77

Conducting research

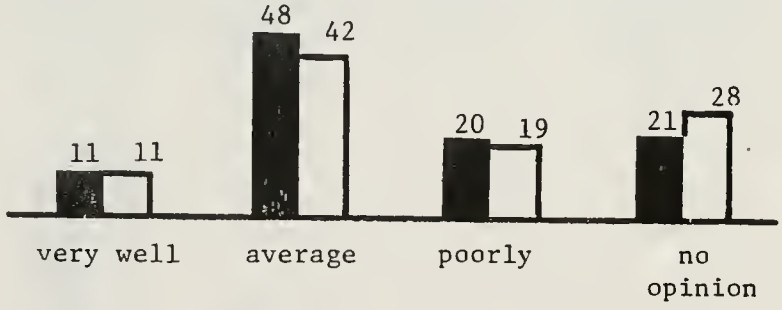


fig. 78

Public service

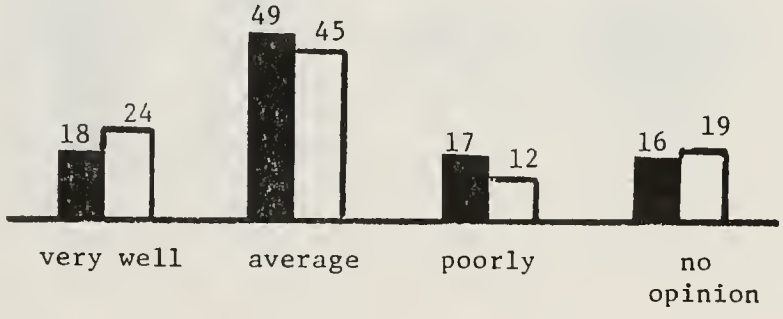


fig. 79

Quality programs

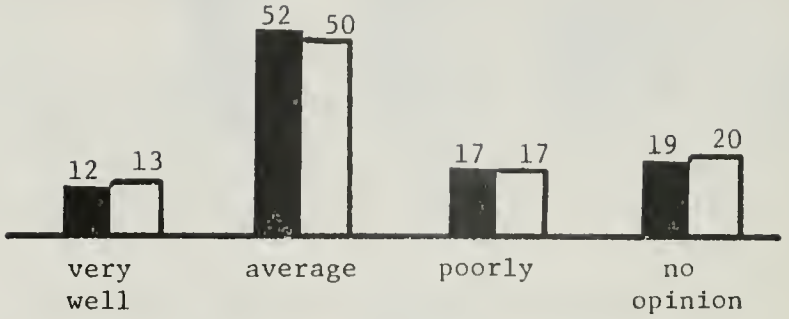


fig. 80

Continuing education

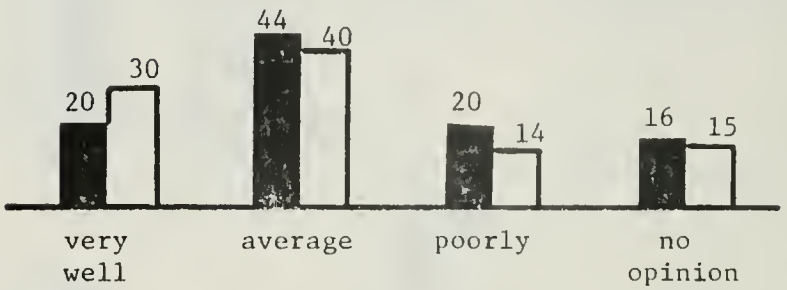
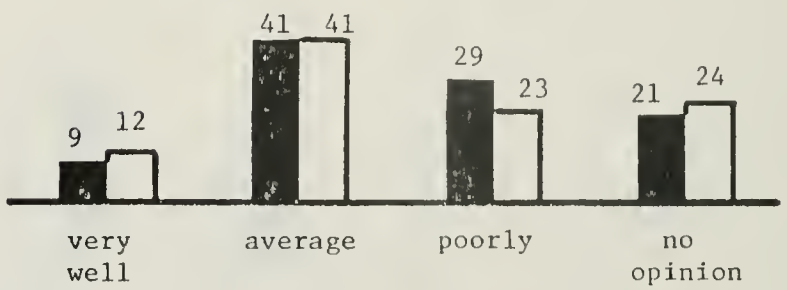


fig. 81

Personal interests



There is an overwhelming concensus of opinion that the instruction of students is the most important function of the University System. Quality programs were also highly valued and rated next in order of importance. Except for the intercollegiate athletic program, all of the other functions were rated important by over half of the respondents. It is instructive to note that women highly value continuing education and community programs.

fig. 82

Instructing students

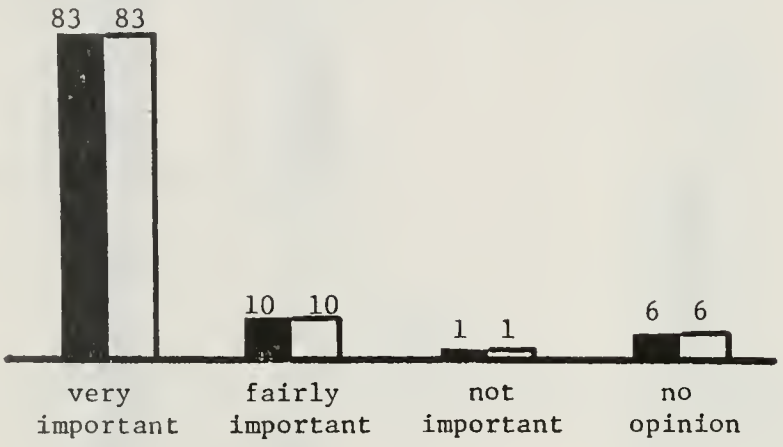


fig. 83

Quality programs

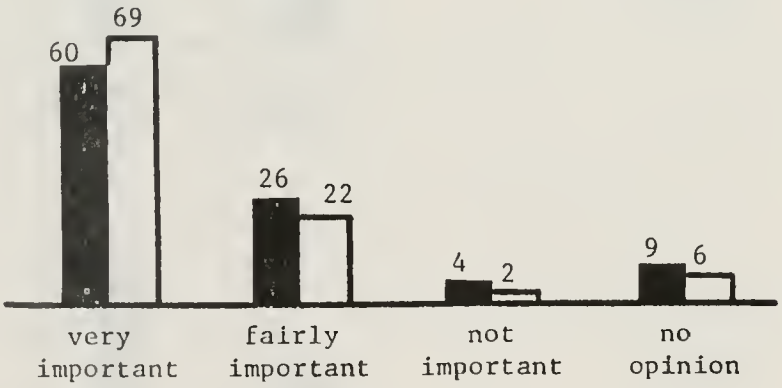


fig. 84

Continuing education

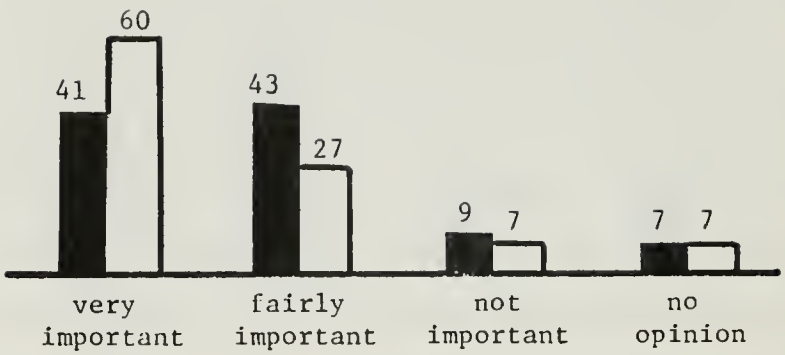


fig. 85

Public service

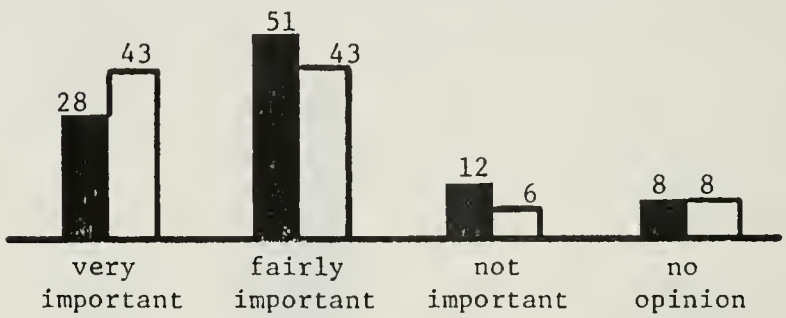


fig. 86

Conducting research

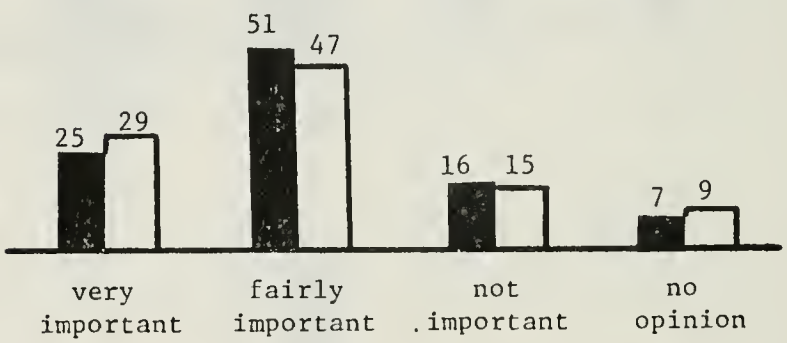


fig. 87

Personal interests

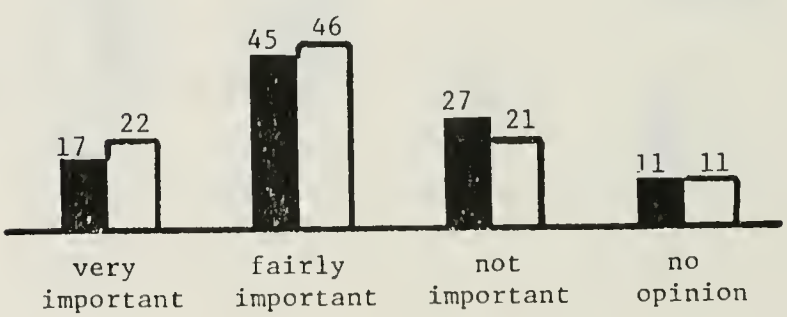
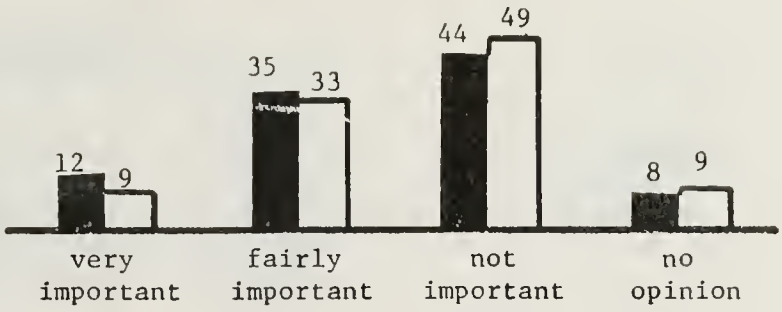


fig. 88

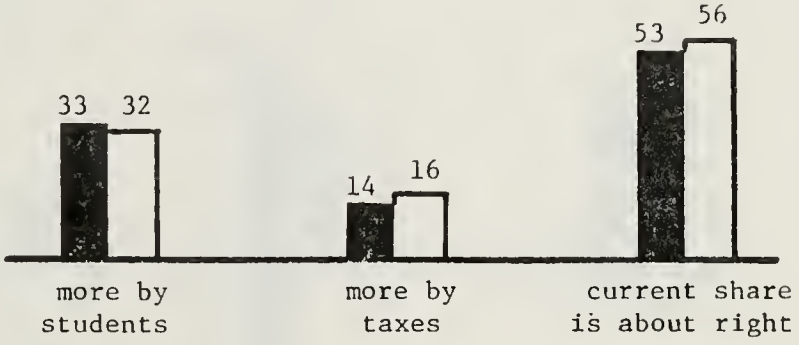
Intercollegiate athletic program



The general public feels that the students share of bearing the cost of higher education should be kept the same or increased. Only about 15% of the persons would decrease the students share by raising taxes.

fig. 89

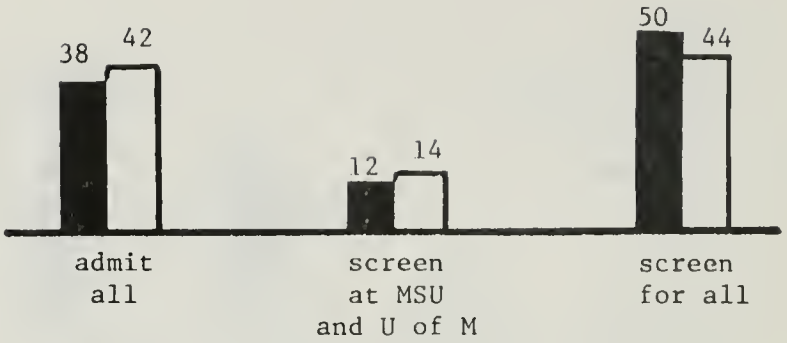
Costs of higher education



People generally do not favor a screening for admissions procedure applied only to the universities at Bozeman and Missoula. A screening procedure should either be applied to all units of higher education or not used at all. It should be noted here, however, that the notion of screening was not defined and could have very bad connotations for some persons.

fig. 90

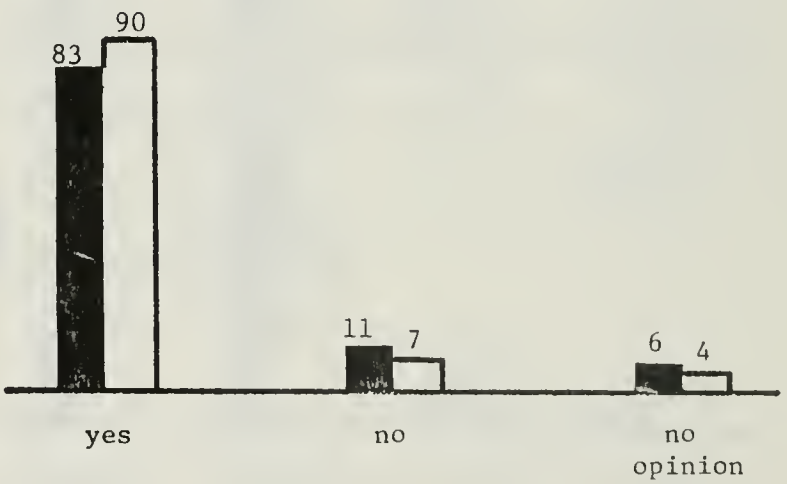
Screening university admission



There is strong support for having a vocational-technical program for high school graduates available in many communities.

fig. 91

Vocational-technical programs

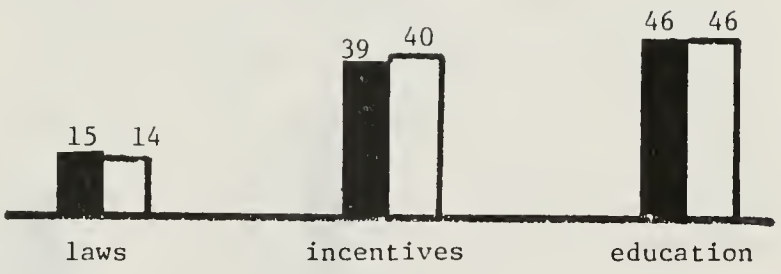


ENERGY DEVELOPMENT AND CONSERVATION

Energy conservation is a critical concern which was expressed in this survey through a large desire for public information and education for voluntary energy saving methods. Incentives for energy saving methods were also ranked high, while laws with penalties for noncompliance were clearly not favored. If such laws are or become necessary, it will be important to provide a great deal of advance general information to the public.

fig. 92

Basic ways to conserve energy



A major energy conservation program is viewed as more likely to have a positive rather than a negative or neutral effect on variables associated with the cost and style of living. However, the wording of this question did not define positive or negative effect; and there could have easily been some confusion on the part of respondents.

fig. 93

Inflation

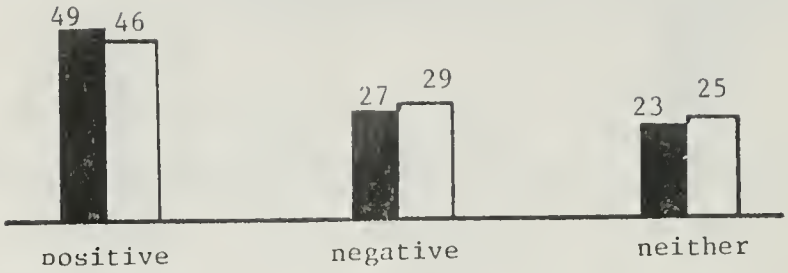


fig. 94

Taxes

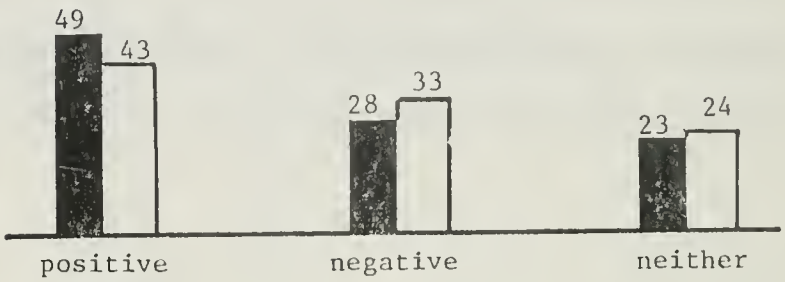


fig. 95

Size of government

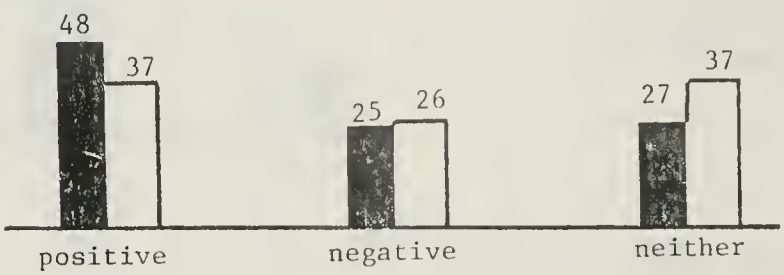


fig. 96

Number of jobs

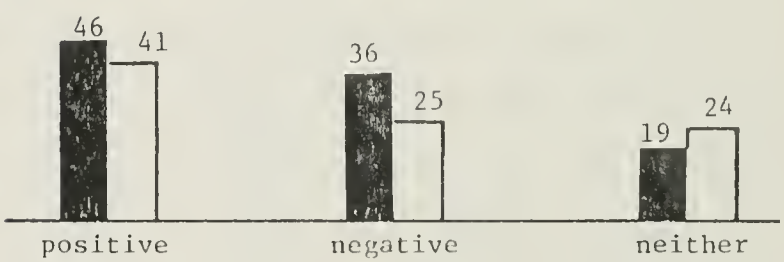


fig. 97

Standard of living

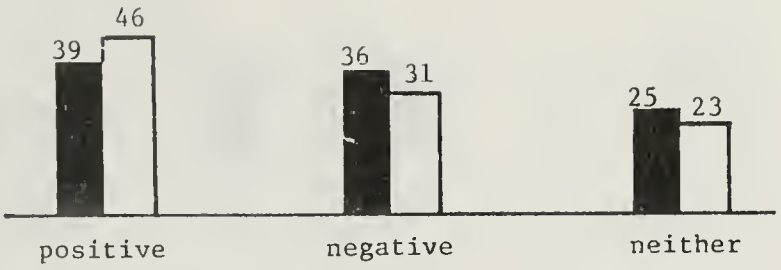
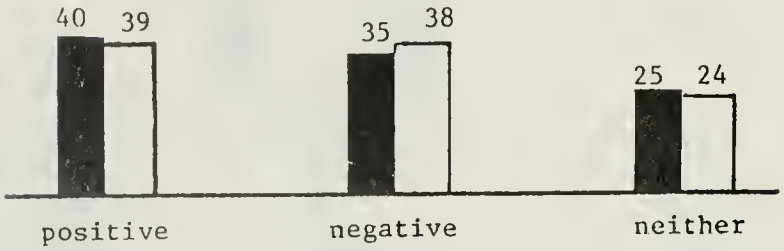


fig. 98

Growth of economy



Most persons agree that the government needs to consider the consequences of energy measures before promoting them, and there is more agreement than disagreement with the notion of using tax incentives to promote the recycling of materials. A consensus on whether or not unit electrical rates should be increased as the amount used increases could not be reached. This is an energy saving concept which may not be completely understood by the public, perhaps a public information program should be considered.

fig. 99

New technologies

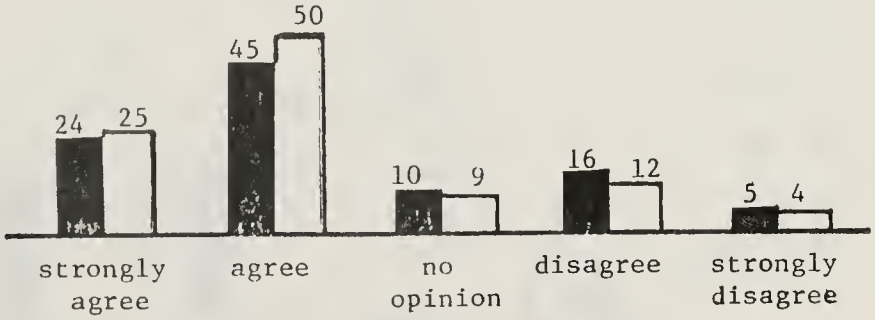


fig. 100

Tax on commodities

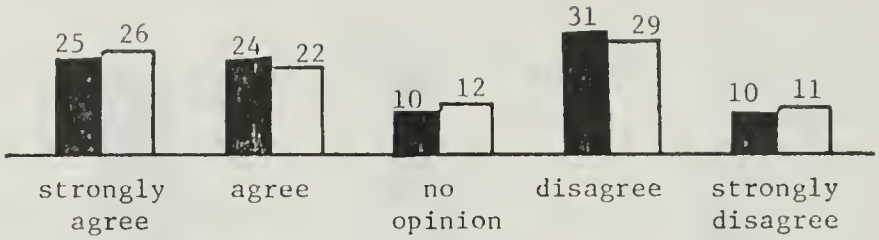


fig. 101

Electricity rates

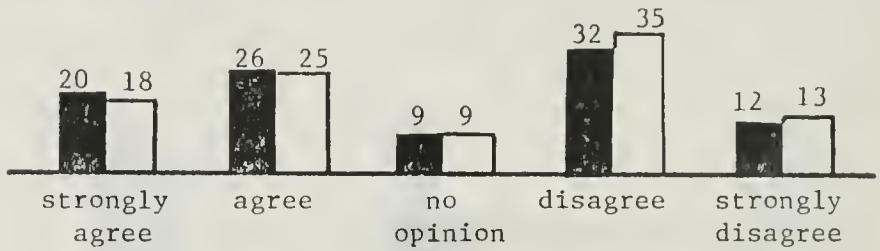
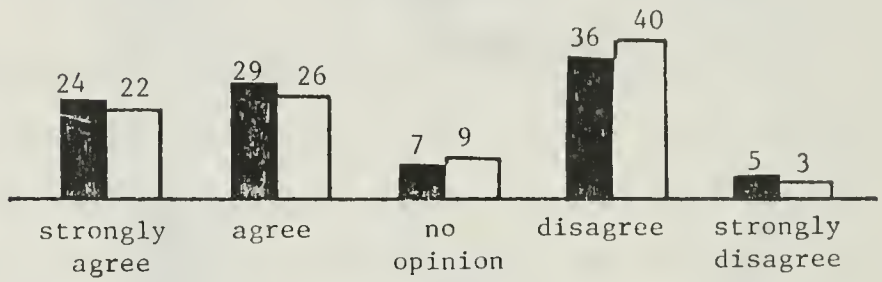


fig. 102

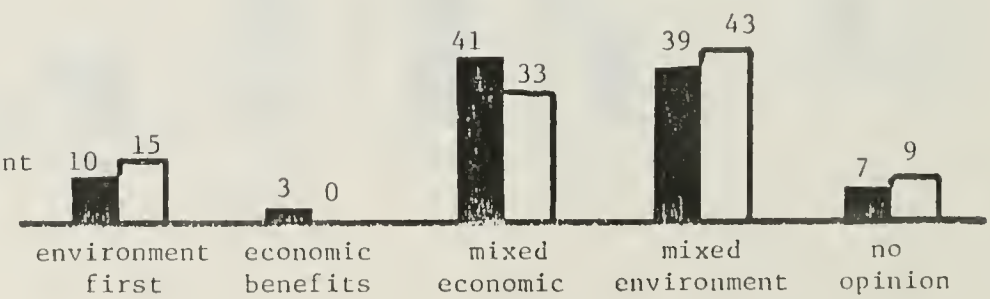
Cost of energy inflated



In conflicts between economic benefits and environmental damage, there is more sympathy for preserving the environment than there is for gaining economic benefits. There is no support for economic gain at any cost to the environment, but there is some support (10-15%) for environmental protection before all else.

fig. 103

Position on energy development



In-state conversion of coal is favored at a ratio of about 5 to 2 statewide, and with a somewhat lower ratio in region 5. Export of coal for out-of-state conversion is not favored. Regional differences do not occur in regard to coal development questions, and this is probably due to the considerable publicity the matter received.

fig. 104

In-state coal conversion

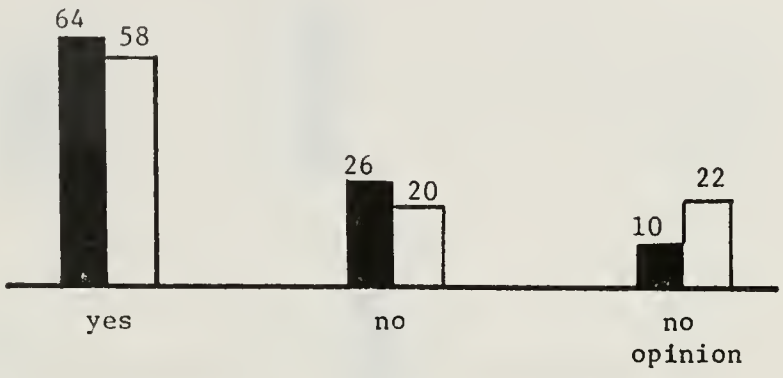
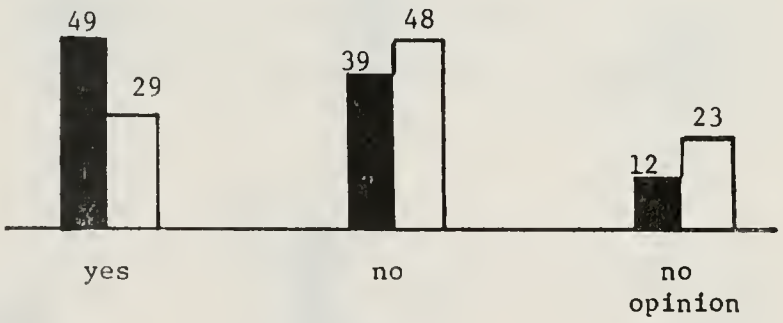


fig. 105

Export coal



In-state conversion of uranium is favored at a ratio of about 4 to 3 statewide and with a higher ratio in region 4. Export of uranium for out-of-state conversion is also favored at a ratio of about 4 to 3.

fig. 106

In-state uranium conversion

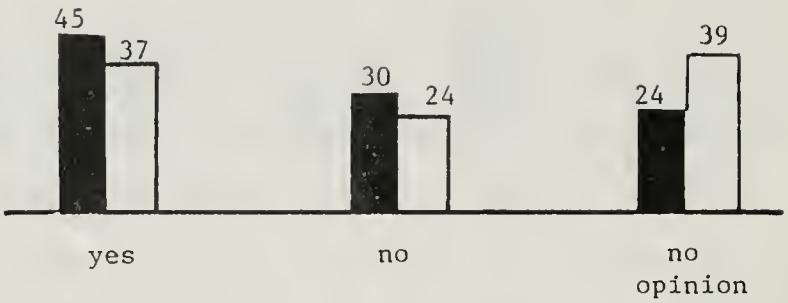
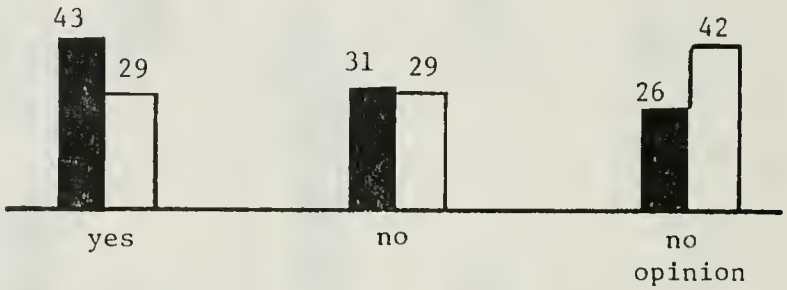


fig. 107

Export uranium



State regulation of where and to what extent coal is mined is favored at a ratio of over 3 to 2 statewide and at a higher ratio in region 5. A somewhat higher ratio holds for regulation of uranium mines.

fig. 108

Location of coal mines

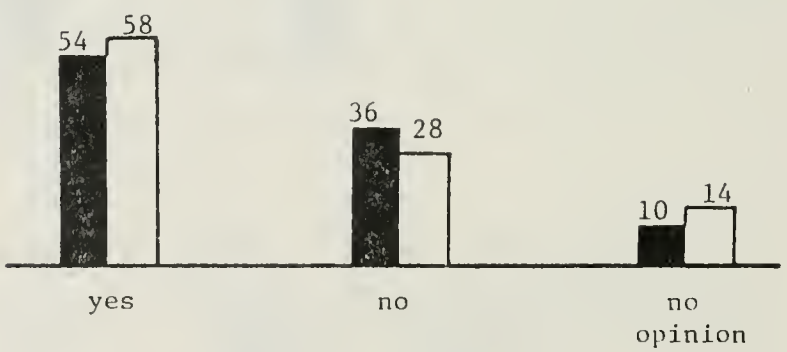
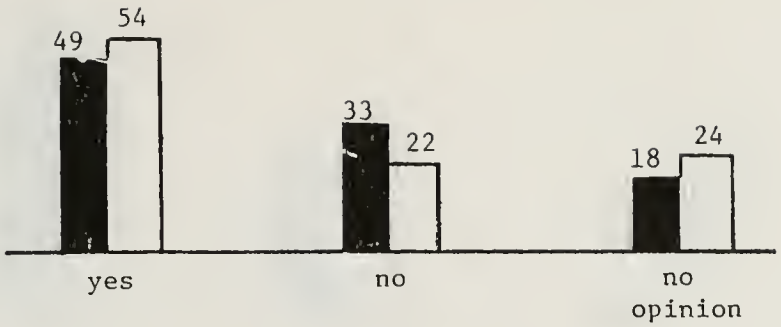


fig. 109

Location of uranium mines



A consistent opinion was registered in favor of the strip mining of land having average or below average productive capability for agriculture, livestock, and wildlife use. Highest priority was given to preserving land with above average capability for agriculture.

fig. 110

High agriculture capability

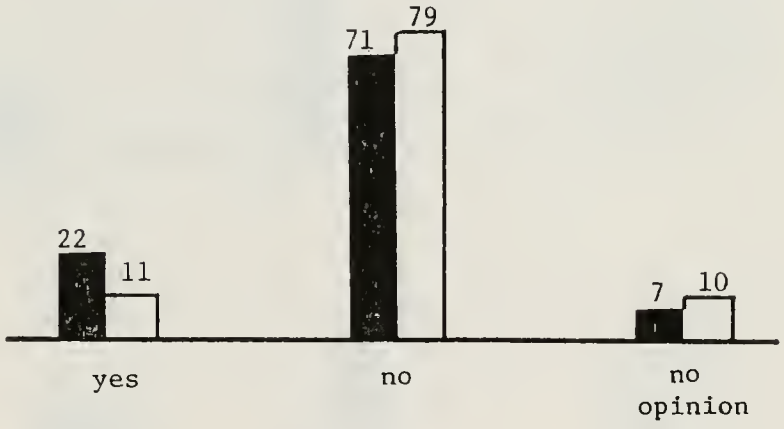


fig. 111

High livestock capability

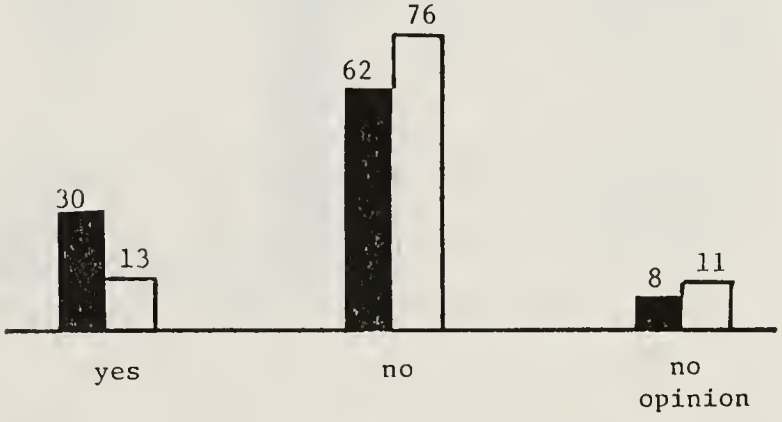


fig. 112

High wildlife capability

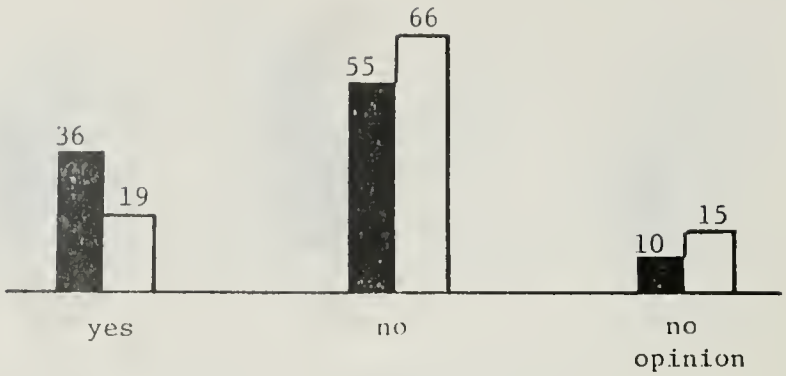


fig. 113

Low agriculture capability

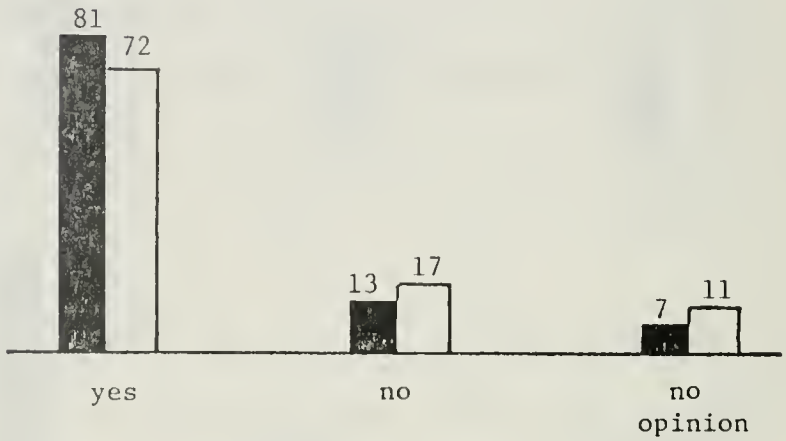


fig. 114

Low livestock capability

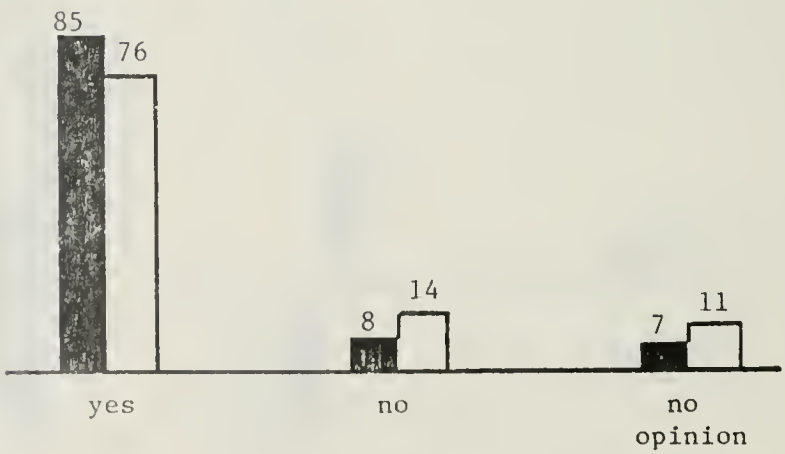
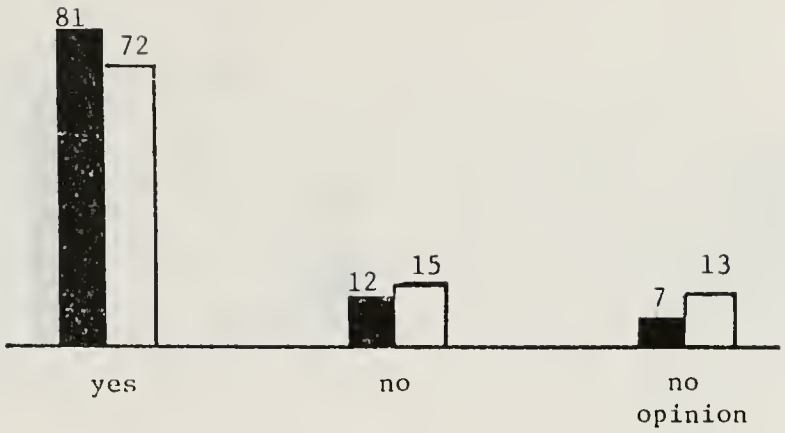


fig. 115

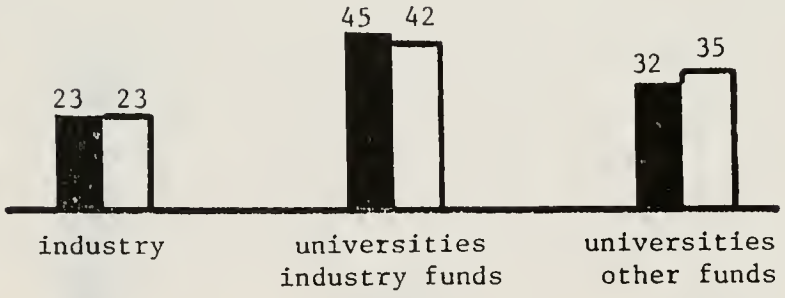
Low wildlife capability



Mine reclamation research by universities and other groups is favored by 77% of the respondents. Funding of this type of research by government funds is favored by 44%, while such funding by industry funds is favored by 33%. Research conducted by industry with industry funds is favored by only 23%. This indicates a general mistrust of big industry and its lack of accountability for its former actions.

fig. 116

Mine reclamation research



Montanans are definitely opposed to increased taxes for mining law enforcement. The public is indifferent to the present status of the reclamation program or the need for additional controls.

fig. 117

Taxes for mining controls

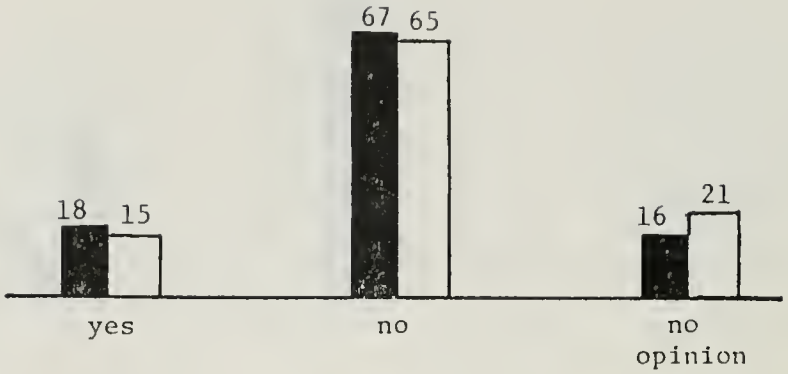


fig. 118

Montana's reclamation program

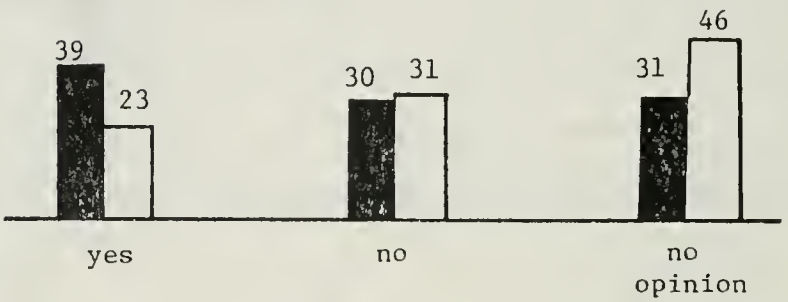
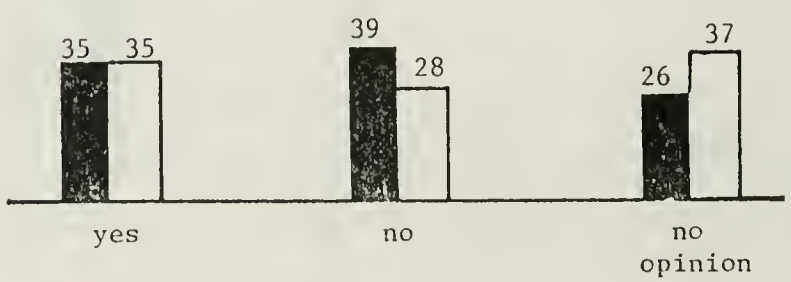


fig. 119

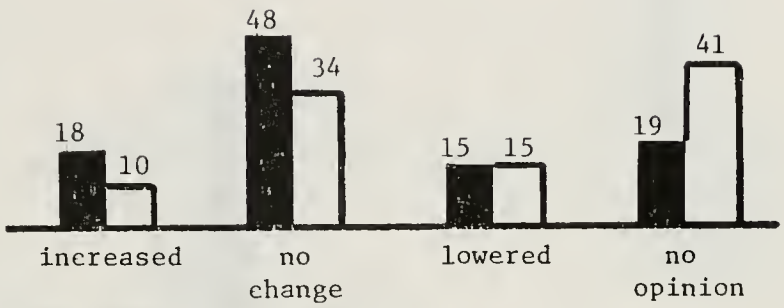
Additional mining controls



Among those persons registering an opinion, about 60% would leave the present coal severance tax unchanged, about 20% would have it increased, and about 20% would have it lowered. Thus an approximate 80% would leave the tax as is or else increase it.

fig. 120

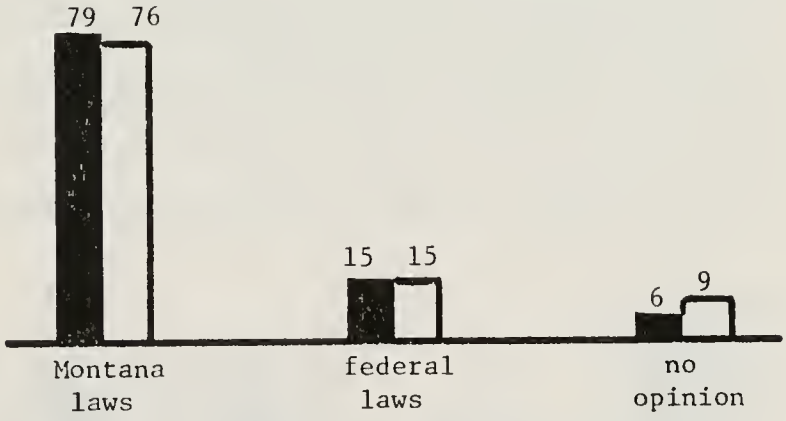
Coal severance tax



Most Montanans feel state laws should apply to the development of federal lands and minerals.

fig. 121

Policies to govern development

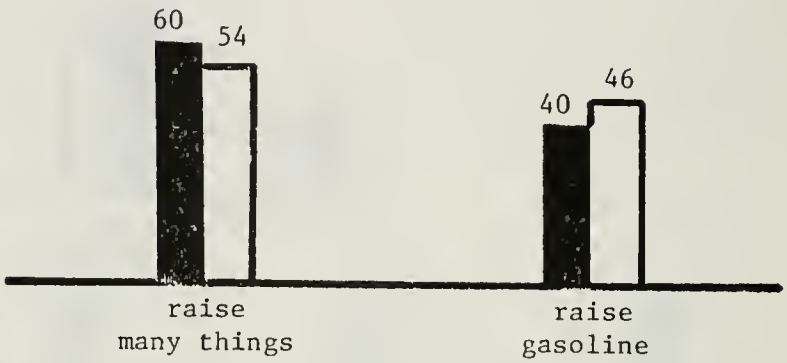


Given a choice, raising the price of gasoline rather than many other things is not prefered as a method of forcing people to save energy. This is probably best interpreted as "don't raise the price of

gasoline". Since to believe that people would really endorse increasing the price of many goods including food and clothing is to believe that they also would accept a general sales tax, a form of price increase that has been repeatedly rejected.

fig. 122

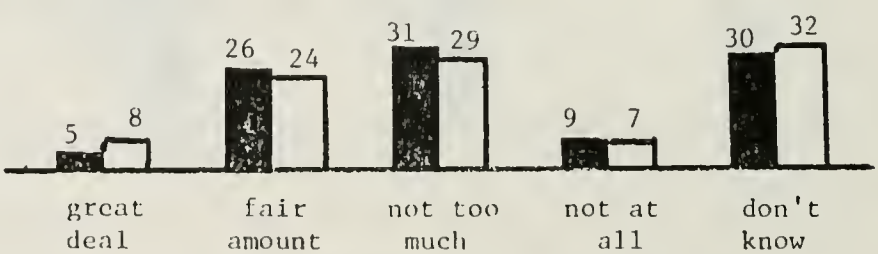
Prices to save energy



If the schools provide energy conservation information, it is generally unknown to the public. This could easily be followed up at the school level to provide additional education on energy saving methods and increase the visibility of such programs. However, since over 2/3 of the persons surveyed do not have children in school, alternative means of public awareness must be used.

fig. 123

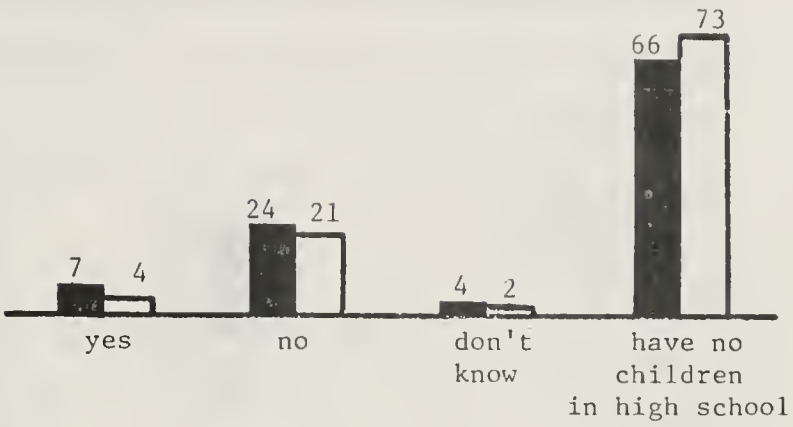
Schools emphasize energy conservation



Schools do not appear to be an adequate medium for conveying information about energy conservation.

fig. 124

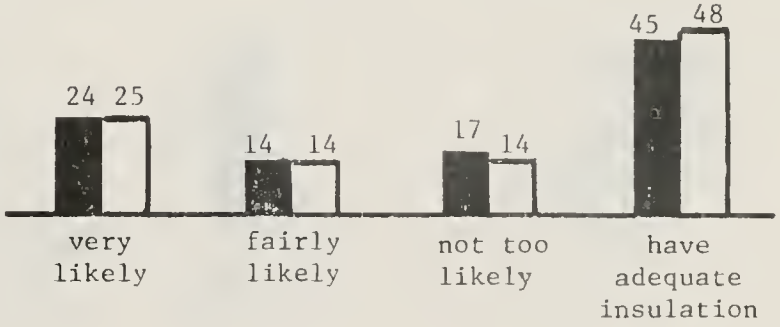
School tips on energy



Over 45% of the respondents feel they already have adequate attic insulation. However, given federal financial assistance, about 39% feel that they might add attic insulation. Information concerning adequate insulation clearly needs to be distributed statewide, and the possibility of assessing the number of dwellings (and other buildings) with insufficient insulation should be considered.

fig. 125

Buy attic insulation

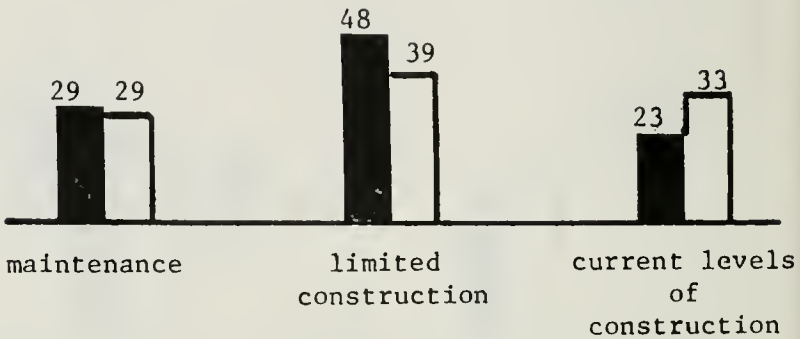


HIGHWAYS

Over 70% of Montanans favor raising state money to maintain and construct highways if federal funds are reduced. However, most persons in this group also prefer a limited construction program.

fig. 126

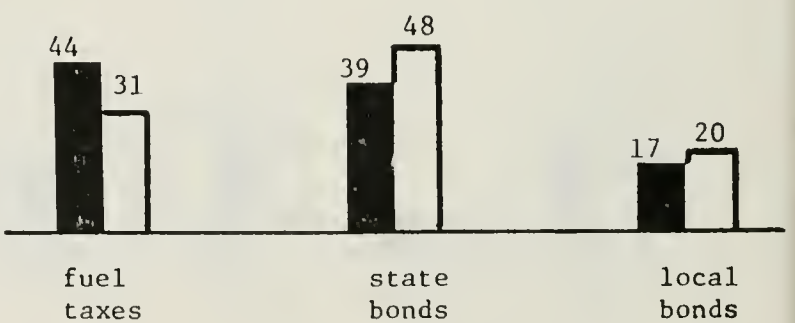
Alternatives to reduced Federal aid



If additional money must be raised to support the Montana highway program, either increased fuel taxes or state level bond issues would be preferred. No clear distinction should be made between these options since relative costs and other comparisons were not included in this survey.

fig. 127

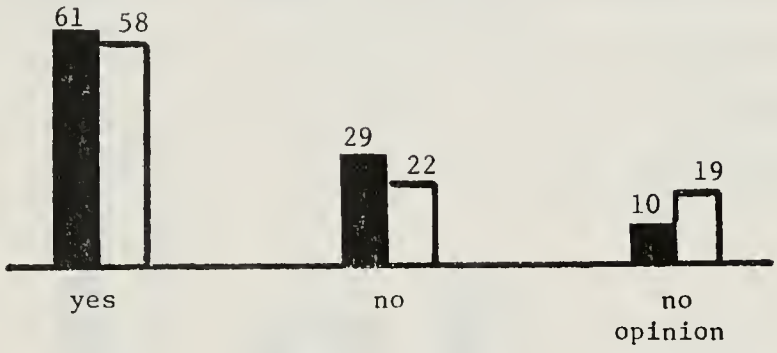
Raising additional highway funds



To pay the states share of the interstate highway program, a majority of persons would prefer raising the gasoline tax 2¢ per gallon. This is a strong preference and could also reflect against using state bond issues as suggested in the previous item. This willingness to increase fuel tax for interstate construction may also indicate a strong feeling to increase utilization of federal aid as much as possible.

fig. 128

Raise gas tax 2¢



AGRICULTURE, LAND USE AND WATER RIGHTS

Land use and planning are important issues in Montana and it appears that the general public is divided between supporting the individuals right to determine the use of his real property and governmental planning.

On a statewide basis, about 2/3 of the respondents feel that Montana land should be preserved for food production. Women in region 2 departed from the general consensus with only 38% expressing this opinion. This seems consistent with the agricultural history of the state. However, more persons agreed than disagreed with the statement that land use should be that which provided the greatest economic benefits. In region 2 this agreement was significantly greater than it was in the rest of the state.

fig. 129

Lands preserved for food production

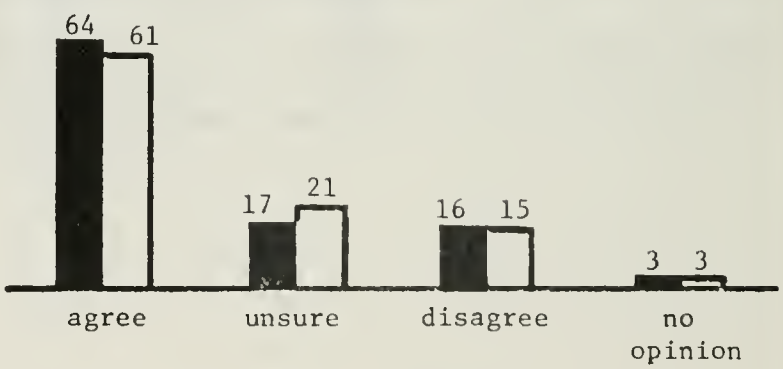


fig. 130

Greatest economic benefits

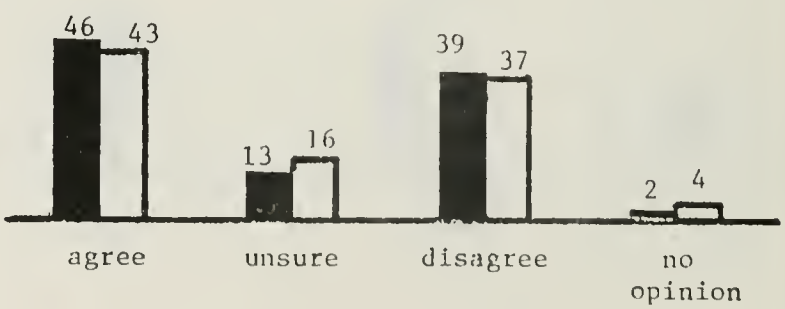
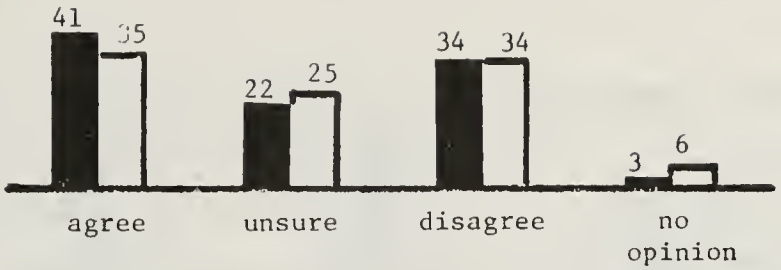


fig. 131

Planning by government



Support for family farms was expressed by the endorsement of both financial assistance and provision of low rent state lands.

fig. 132

Capital available to family farmers for financing

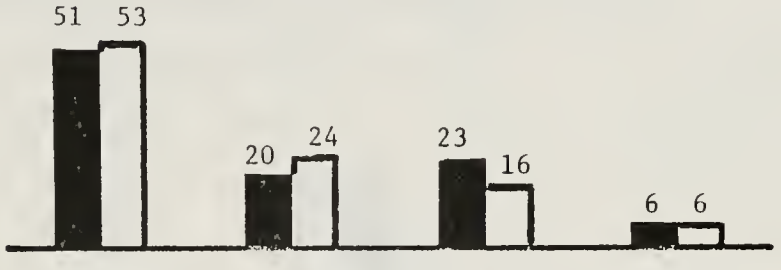
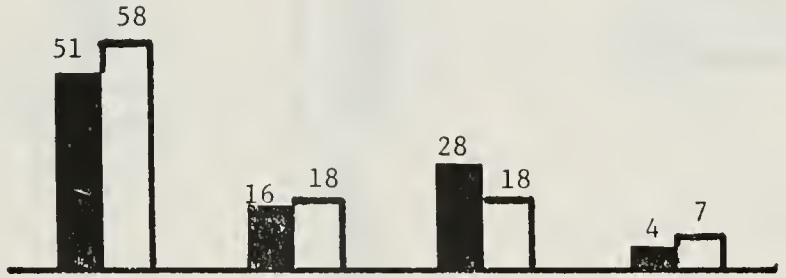


fig. 133

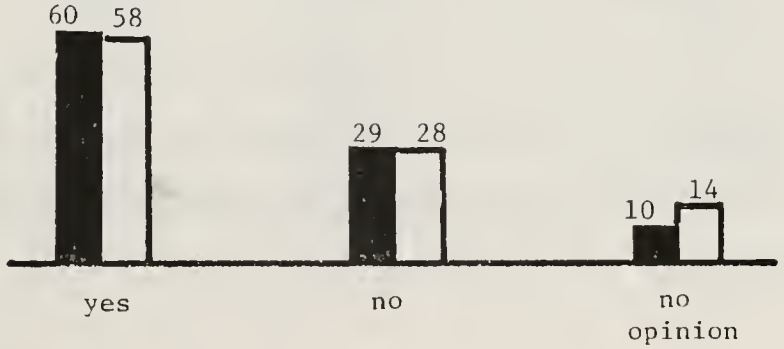
Assist family farming



Support of a national agricultural program providing for the stockpiling of food was favored by almost 60% of the respondents.

fig. 134

Stockpiling of food



To help alleviate the cost/price squeeze on livestock producers, Montanans tend to favor government control of external factors and financial assistance. They did not favor other federal action which restricts or influences their production strategies. Restrictive import quotas were the most strongly favored remedy, with over 80% supporting this measure. Increased loan programs should also be seriously considered since at least 12% more people agreed with this option than disagreed.

fig. 135

Restrictive import quotas

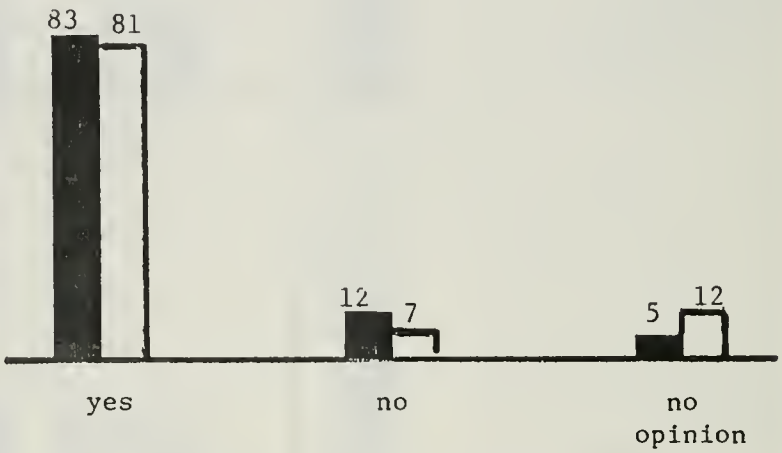
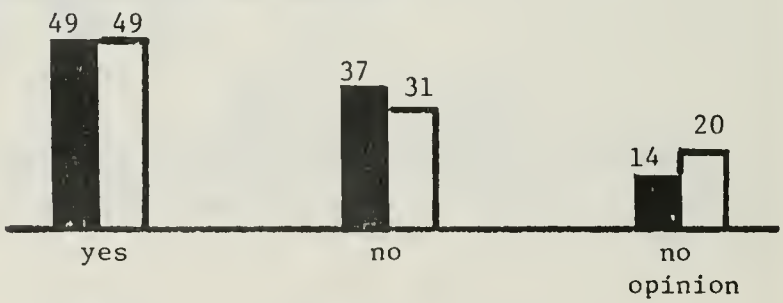


fig. 136

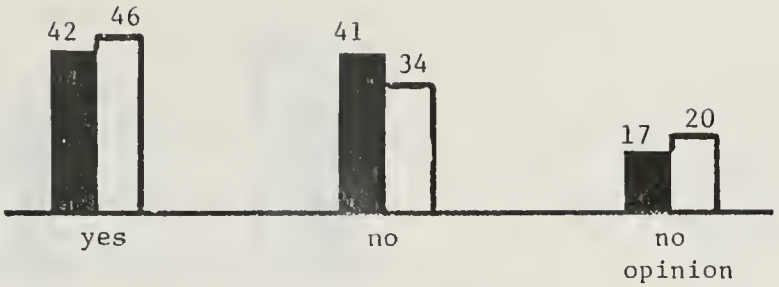
Agricultural loan programs



In region 1 a clear majority favored federally funded food programs for schools and institutions, however in the remainder of the state opinion was divided and significant differences were not found.

fig. 137

Federally funded food programs



Programs which control production or provide for federal purchase were rejected in every region of the state.

fig. 138

Federal purchases

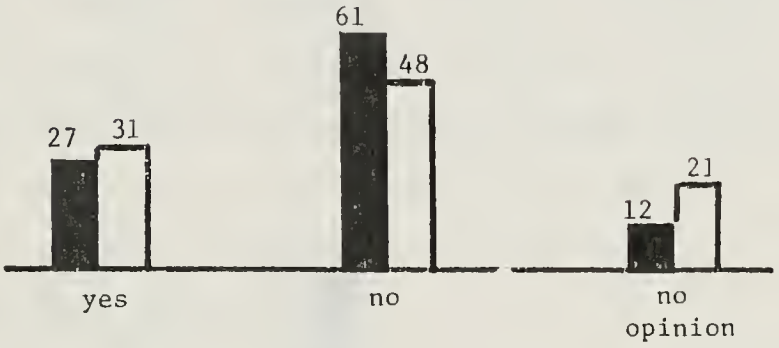
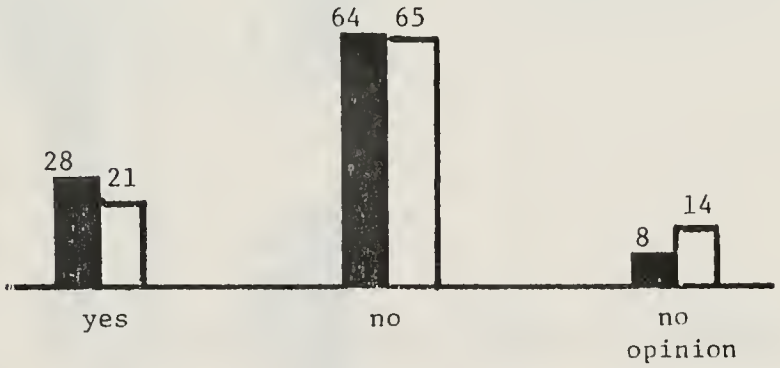


fig. 139

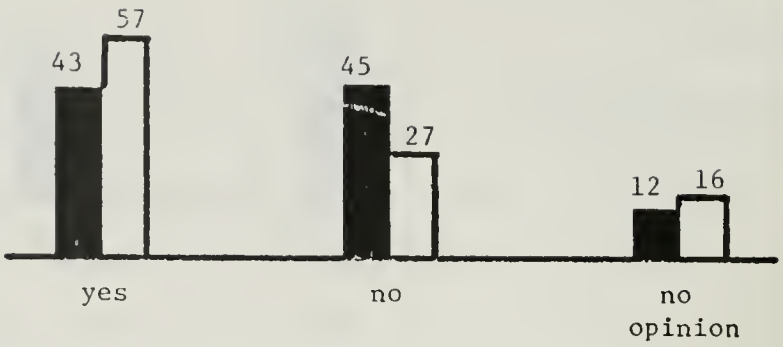
Controlled production



Overall, there appears to be more support for than opposition to federal subsidies to rail transporation for agricultural products. Women tend to clearly support this, while men are almost evenly divided.

fig. 140

Subsidize rail transportation



Water rights are no less important to society today than they were to the miners and ranchers in the 1800's. However, there is a clear tendency to involve governmental units in water planning. Almost 3/4 of the respondents felt that local government should be more involved in water planning programs, and that this effort should be statewide.

fig. 141

Water planning by local government

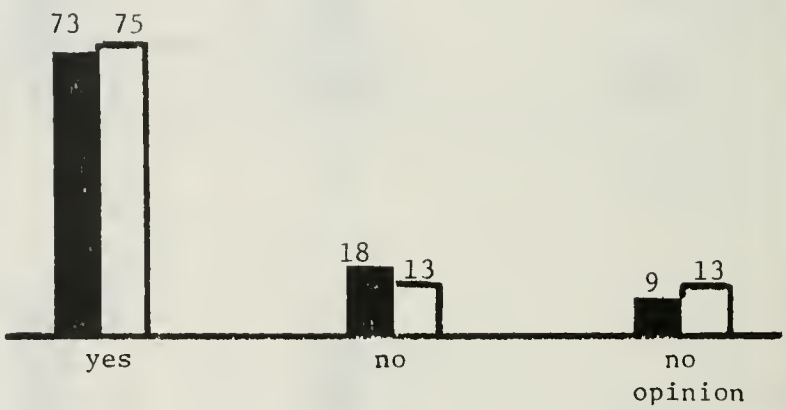
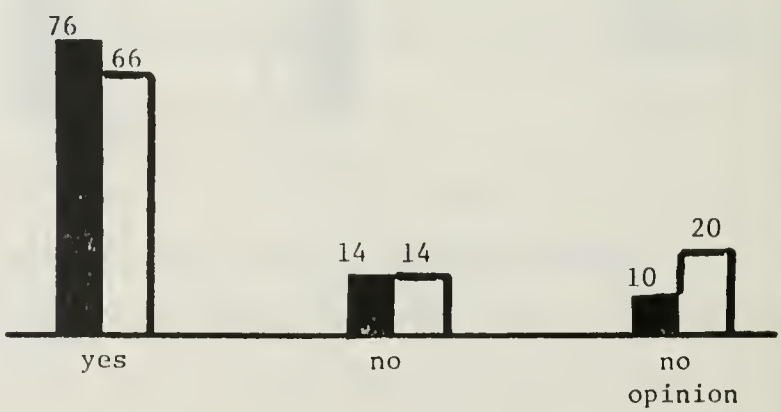


fig. 142

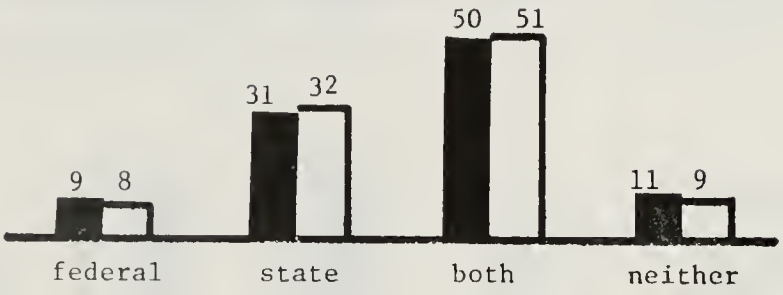
Determining statewide water rights



One half the respondents felt that both state and federal funding sources should be used for water planning.

fig. 143

Funding for local water planning



Highest priority for water rights was clearly given to agricultural uses. Domestic use, fish and wildlife and municipal uses received middle priorities while lowest priorities for water went to industry mining and recreational uses.

fig. 144

Agriculture

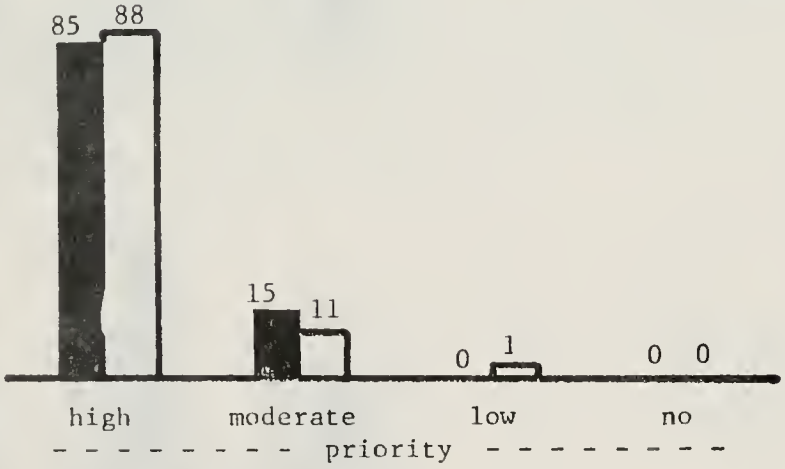


fig. 145

Domestic

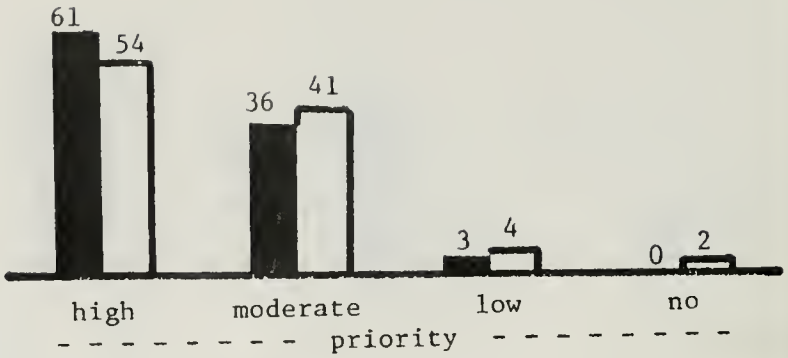


fig. 146

Fish and wildlife

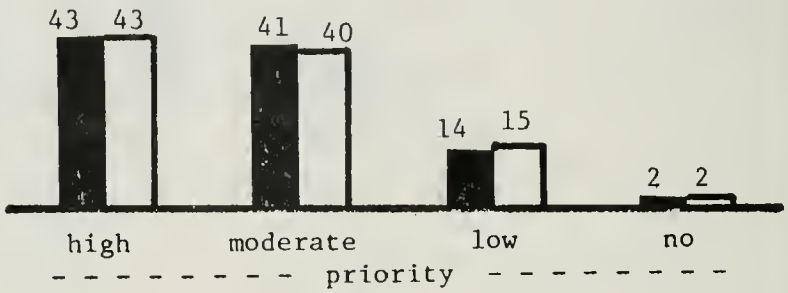


fig. 147

Municipal

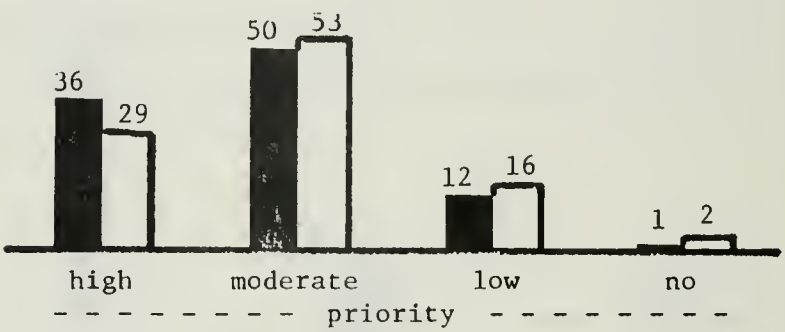


fig. 148

Industry

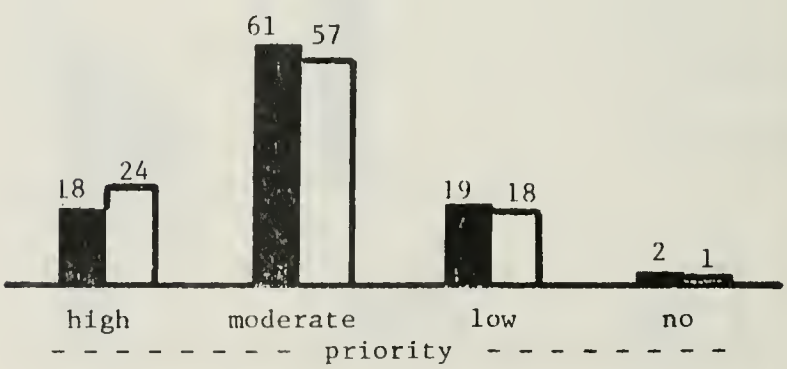


fig. 149

Mining

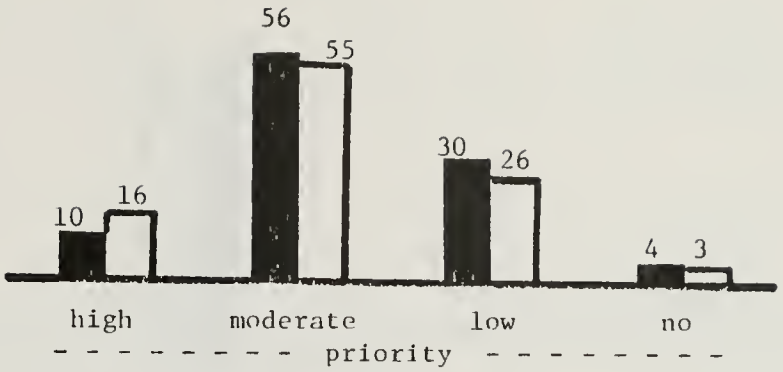
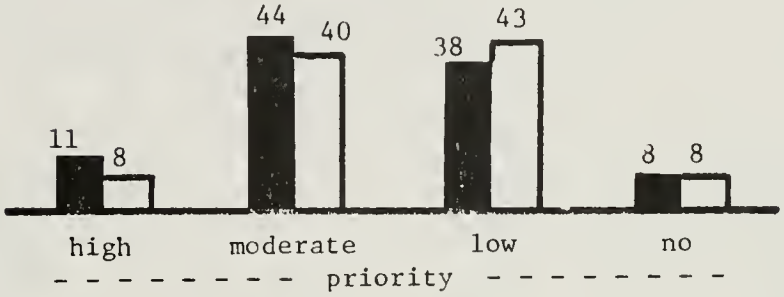


fig. 150

Recreational



Montana's game animals are an acknowledged resource for residents and non-residents, and for hunters and general observers. Over 55% of the men and over 20% of the women in Montana claim to be hunters, and fewer than one in seven oppose hunting. Whether they hunt or not, approximately 70% of Montana's residents make special efforts to observe wildlife in its natural setting.

fig. 151

Position concerning hunting

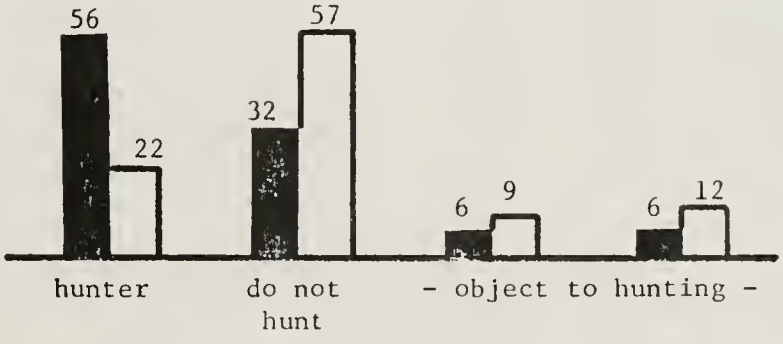
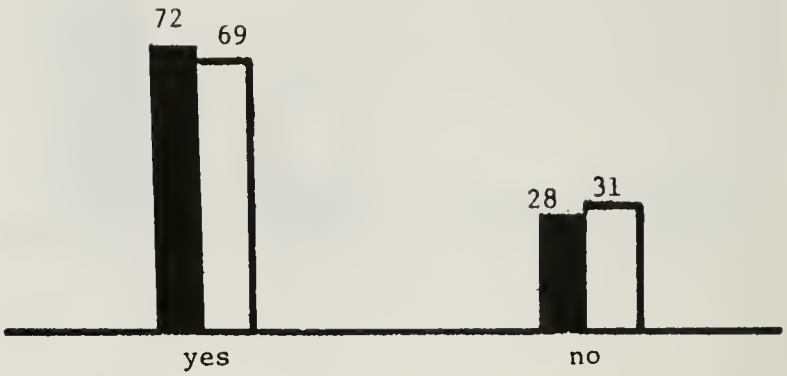


fig. 152

Observe
wildlife



MONTANA FUTURES SURVEY

i is a statewide opinion survey providing for public input into policy and planning alternatives for e future of Montana. This opportunity to have a direct voice in shaping the future of our state is o.ded for by the administration of Governor Judge in the interest of improved quality of life for nana residents.

l·esponses will be completely annonymous. Please use the enclosed postpaid envelope to return the m.eted opinion survey form to Montana State University for tallying.

YOUR OPINIONS ARE IMPORTANT
Please take 10 minutes to complete this survey now.

C.L SERVICES AND PUBLIC SAFETY Place an X in the box by your choice.

low important do you feel each of the following are in dealing with future crime rates?	Very Important	Important	Not Important	No Opinion
lave judges give longer jail sentences	☐	☐	☐	☐
:nact strong gun control legislation	☐	☐	☐	☐
)ecentralize the penal system and emphasize rehabilitation.	☐	☐	☐	☐
:onsolidate law enforcement units	☐	☐	☐	☐
lire more law enforcement personnel	☐	☐	☐	☐

low safe do you feel in your community at night?

'ery safe ☐ Reasonably safe ☐ Somewhat unsafe ☐ Very unsafe ☐

:hould the state provide health clinics for rural areas?

'es ☐ No ☐ No opinion ☐

:hould the state subsidize medical doctors who are willing to locate in sparsely settled areas?

'es ☐ No ☐ No opinion ☐

:hould personnel who man emergency vehicles have certified medical training in emergency work?

'es ☐ No ☐ No opinion ☐

:tates may use several strategies for treating crime. What priority do you feel Montana should give o each of the following methods of correction?	High Priority	Moderate Priority	Low Priority	No Priority
:ducate and prepare offenders for legitimate careers	☐	☐	☐	☐
)uick and sure punishment, including capitol punishment	☐	☐	☐	☐
lelp former offenders adjust and be accepted into communities	☐	☐	☐	☐
:stablish means for repaying victims for their losses	☐	☐	☐	☐
:eparate and isolate violators from the community	☐	☐	☐	☐
:reate programs which reduce the social causes of crime	☐	☐	☐	☐

'hat priority do you feel the state should give to the ollowing programs for treating mentally ill or incompetent ersons?	High Priority	Moderate Priority	Low Priority	No Priority
:ommunity services so they may function as well as possible	☐	☐	☐	☐
'rain and educate the incompetent to function in society	☐	☐	☐	☐
'reatment and guidance programs for all of them	☐	☐	☐	☐
nstitutionalize persons for as long as is necessary	☐	☐	☐	☐
'repare communities to accept and understand them	☐	☐	☐	☐

NMENT AND COMMUNITY AFFAIRS

ow much confidence do you have that the following government ffices fairly represent the interests of Montanans?	High confidence	Some confidence	No confidence	Not sure
he governor	☐	☐	☐	☐
he state legislature	☐	☐	☐	☐
tate courts	☐	☐	☐	☐
tate agencies	☐	☐	☐	☐
ounty government	☐	☐	☐	☐
ity government	☐	☐	☐	☐

2. In general, how much consideration do you expect your state legislator to give to each of the following when he/she votes on proposed bills.

	Very high priority	High priority	Moderate priority	
The opinions of the people in his/her district	☐	☐	☐	
The advice of interest groups	☐	☐	☐	
His/her own best judgement	☐	☐	☐	
The advice of his/her political party leaders	☐	☐	☐	

3. Assume that you are a state legislator and have the following proposals before you. How would you vote on each one?

	For	Against	
A bill to use tax dollars to create temporary public service jobs	☐	☐	
A bill to give tax breaks to private businesses as incentives to expand and provide more jobs	☐	☐	
A bill to create a state land use and planning agency	☐	☐	
A bill establishing a state sales tax on all retail sales	☐	☐	
A bill requiring public access for recreational purposes across private lands to public lands	☐	☐	
A bill establishing a state public television network	☐	☐	
A bill to make city and county land use planning and regulation mandatory	☐	☐	

4. If you as a legislator had to choose between increasing state taxes to maintain existing services or lowering taxes and thereby reducing the services listed below, which would you choose?

	Increase Taxes	Reduce Services
Road construction and maintenance	☐	☐
Higher education	☐	☐
Social and Health services	☐	☐
Law enforcement and corrections	☐	☐
Recreational facilities and service	☐	☐

5. All Montana cities and counties recently completely the local government voter review process. Do you think that this activity was: (Choose one)

- ☐ Very useful and should be repeated every ten years
- ☐ Useful, but not worth repeating
- ☐ Of no importance
- ☐ No opinion
- ☐ I was unaware that such a voter review process had occurred

6. With a fixed amount of state money available for local transportation needs, how much priority would you give towards allocating it to each of the following categories?

	Very high priority	High priority	Moderate priority	
Arterial highways	☐	☐	☐	
Rural roads	☐	☐	☐	
Airports	☐	☐	☐	
Local mass transit (buses)	☐	☐	☐	
Bikeways	☐	☐	☐	

7. Listed below are five kinds of services that local governments provide to citizens. Indicate the extent to which you think they deserve state tax support.

	High tax support	Moderate support	Low tax support
Welfare	☐	☐	☐
Library	☐	☐	☐
Parks and Recreation	☐	☐	☐
Health Services	☐	☐	☐
Santation Services	☐	☐	☐
Police Protection	☐	☐	☐
Fire Protection	☐	☐	☐

8. Some community problems are local in nature, and others have a state-wide impact. Do you think: (Choose one)

- ☐ It would be better to give local governments more power?
- ☐ It would be better to expand state control over more areas?
- ☐ The balance between state government and local goverment power is just about right?

9. If federal aid is available, how much priority would you give towards allocating this aid to each of the following areas?

	Very high priority	High priority	Moderate priority	
Public employment	☐	☐	☐	
Recreation	☐	☐	☐	
Social and health services	☐	☐	☐	
Public education	☐	☐	☐	
Conservation and natural resource development	☐	☐	☐	
Law enforcement and correction	☐	☐	☐	
Highway construction and maintenance	☐	☐	☐	

In your opinion which level of government should have the major administrative responsibility for these problems?

	Local	State	Federal	Not sure
Health and Welfare	☐	☐	☐	☐
Natural resource management	☐	☐	☐	☐
Law enforcement	☐	☐	☐	☐
Highways and roads	☐	☐	☐	☐
Land use planning and control	☐	☐	☐	☐

EDUCATION

How well do you think the University System is performing each of the following functions?

	Very well	Average	Poorly	No Opinion
Instructing students	☐	☐	☐	☐
Conducting research on public problems	☐	☐	☐	☐
Performing public service through extension and other services	☐	☐	☐	☐
Maintaining quality programs	☐	☐	☐	☐
Making higher education available to more people through continuing education and other community programs	☐	☐	☐	☐
Contributing to the personal interests (cultural, social, etc.) of you and your family	☐	☐	☐	☐

How important do you think each of the following University System functions is?

	Very Important	Fairly Important	Not Important	No Opinion
Instructing students	☐	☐	☐	☐
Conducting research on public problems	☐	☐	☐	☐
Performing public service through extension and other services	☐	☐	☐	☐
Maintaining quality programs	☐	☐	☐	☐
Making higher education available to more people through continuing education and other community programs	☐	☐	☐	☐
Contributing to the personal interests (cultural, social, etc.) of you and your family	☐	☐	☐	☐
Supporting an intercollegiate athletic program	☐	☐	☐	☐

Considering the costs of higher education, do you think: (Choose one)

- More costs should be paid by students, less by taxes. ☐
- More costs should be paid by taxes, less by students. ☐
- The current share from students and taxes is about right ☐

Any graduate of a Montana High School should be: (Choose one)

- Admitted to any unit of the Montana College and University System ☐
- Screened for admittance to the University of Montana and Montana State University ☐
- Screened for admittance to any unit of the college and university system ☐

Would you favor having a wide range of vocational-technical programs for high school graduates available in many communities throughout the state?

Yes ☐ No ☐ No opinion ☐

DEVELOPMENT AND CONSERVATION

Montana can strive to conserve energy in three basic ways. Choose the one method you think is best.

- Laws requiring energy conservation practices, including penalties and/or fines for noncompliance ☐
- Incentives for conforming to energy-saving methods, including subsidies and tax rebates. ☐
- Public information and education programs explaining new methods of saving energy voluntarily. ☐

Do you believe that a major energy conservation program will have a positive, negative or no effect on each of the following activities?

	Positive	Negative	Neither
Growth of economy	☐	☐	☐
Standard of living	☐	☐	☐
Taxes	☐	☐	☐
Inflation	☐	☐	☐
Size of government	☐	☐	☐
Number of jobs	☐	☐	☐

3. Please indicate your opinion about each of the following statements.

	Strongly Agree	Agree	No Opinion	Disagree	S D
There should be a tax on such commodities as bottles, cans, newspapers, and automobiles as an incentive to recycle the materials.	☐	☐	☐	☐	
The rates charged for electricity should be increased, as the amount consumed is increased, rather than lowered as consumption increases.	☐	☐	☐	☐	
Governments should not promote new energy technologies until possible related negative consequences have been studied.	☐	☐	☐	☐	
The cost of energy sources such as gasoline and electricity has inflated much more rapidly than other things I have to buy.	☐	☐	☐	☐	

4. Which of the following statements is closest to your idea concerning energy development? (Choose one)

The environment should be preserved at any cost ☐
Economic benefits are worth any environmental damage ☐
Mixed feelings, but conflict should be resolved in favor of economic benefits ☐
Mixed feelings, but conflict should be resolved in favor of environmental benefits ☐
No opinion ☐

5. Do you favor:
In-state conversion of coal?
Yes ☐ No ☐ No opinion ☐

Export of coal for conversion elsewhere?
Yes ☐ No ☐ No opinion ☐

6. Do you favor:
In-state conversion of uranium?
Yes ☐ No ☐ No opinion ☐

Export of uranium for conversion elsewhere?
Yes ☐ No ☐ No opinion ☐

7. Do you believe that state government should establish criteria regulating the location and number of coal mines?
Yes ☐ No ☐ No opinion ☐

Do you believe that state government should establish criteria regulating the location and number of uranium mines?
Yes ☐ No ☐ No opinion ☐

8. Should strip mining (in compliance with reclamation laws) be allowed on:

	Yes	No	O
Lands with above average productive capability for agriculture?	☐	☐	
Lands with above average productive capability for livestock?	☐	☐	
Lands with above average productive capability for wildlife?	☐	☐	
Lands with average or below average productive capability for agriculture?	☐	☐	
Lands with average or below average productive capability for livestock?	☐	☐	
Lands with average or below average productive capability for wildlife?	☐	☐	

9. Mine reclamation research to identify problems and to investigate solutions to these problems is being attempted. How do you think this could be handled best? (Choose one)

Research conducted by industrial personnel with industry funds ☐
Research conducted by consultants, universities or other groups with industry funds ☐
Research conducted by consultants, universities or other groups with county, state or federal funds ☐

10. Are you satisfied with the present status of Montana's mining reclamation program?
Yes ☐ No ☐ No opinion ☐

11. Do you favor additional mining controls?
Yes ☐ No ☐ No opinion ☐

12. Do you favor increased taxes to provide and enforce additional mining controls?
Yes ☐ No ☐ No opinion ☐

13. Montana has the highest coal severance tax in the nation for strip mined coal. Which of the following most closely states your feelings about the severance tax? (Choose one)

The coal severance tax should be increased. ☐
The coal severance tax should not be changed ☐
The coal severance tax should be lowered ☐
No opinion ☐

hould Montana's laws and policies govern development of federally-owned lands and inerals (excluding Indian reservations) within Montana's borders?

es, Montana laws and policies should apply . . . . . ☐
o, federal laws and policies should apply . . . . . ☐
o opinion . . . . . ☐

igher prices may force people to save more energy. Which do you think would be the etter way to force people to save energy? (Choose one)

aise price of many things (food, clothing, heating, gasoline, etc.) a little . ☐
aise price of gasoline a lot . . . . . ☐

ased on what you know or have heard, how much do the schools emphasize energy conservation?
reat deal ☐ Fair amount ☐ Not too much ☐ Not at all ☐ Don't know ☐

f you have children in high school, have they brought home from school any lists of tems, information, or tips on how to save energy (in your home or in using your car)?
es ☐ No ☐ Don't know ☐ Have no children in high school ☐

f the Federal Government were to give back one-fourth of the cost, how likely is it hat you would buy attic insulation within the next three months? (Choose one)
ery likely ☐ Fairly likely ☐ Not too likely ☐ Have adequate insulation ☐

AYS

f the federal government reduces the amount of money they spend in supporting the ontana highway system, which of the following actions should the State of Montana ake? (Choose one)

se what money is available for maintenance only . . . . . ☐
upport current maintenance level plus limited construction by raising additional money . . . ☐
ontinue highway maintenance and construction at current levels by raising additional money . ☐

f the state must raise additional money to support the Montana highway program, hich method would you most prefer? (Choose one)

aise state fuel taxes . . . . . ☐
ell state level bond issues to finance the program . . . . . ☐
ell local level bond issues to finance the program in that locality . . ☐

t has been estimated that it would cost one billion dollars to complete the interstate ystem within Montana and bring our primary highway system up to modern standards. If urrent formulas for federal support are maintained, should Montana raise the gasoline ax 2¢/gallon to pay their share of this program and insure maximum federal support?
es ☐ No ☐ No opinion ☐

ULTURE, LAND USE, AND WATER RIGHTS

e would like your opinion about each of the following statements.

	Agree	Unsure	Disagree	No Opinion
ontana lands should be preserved for food production as opposed to living space or recreational use	☐	☐	☐	☐
here should be greater land use planning by government . . .	☐	☐	☐	☐
and should be used for whatever use provides the greatest economic benefits	☐	☐	☐	☐
here should be expanded amounts of capital available to groups of family farmers for financing development of facilities to market or process their production	☐	☐	☐	☐
here should be a state program to assist persons to enter family farming and ranching by renting state owned land to them, by assisting in rent payments for a few early start-up years, and by providing low interest financing for land purchases .	☐	☐	☐	☐

o you favor a national agricultural program which provides for the stockpiling of food o guard against future shortages or needs?
es ☐ No ☐ No opinion ☐

3. Many livestock producers are caught in an extreme cost/price squeeze. Would you favor the following programs as possible remedies to this situation?

	Yes	No	No Opinion
Federal purchases of agricultural products	☐	☐	☐
Controlled production	☐	☐	☐
More restrictive import quotas	☐	☐	☐
More agricultural loan programs	☐	☐	☐
More comprehensive federally funded school and institution food programs	☐	☐	☐

4. Do you feel the rail transportation systems to rural areas should be federally subsidized if necessary to insure adequate transportation for agricultural products?
Yes ☐ No ☐ No opinion ☐

5. Do you feel that local government should become involved in more state water planning programs?
Yes ☐ No ☐ No opinion ☐

6. Where do you think funding for local water planning should come from? (Choose one)
Federal level ☐ State level ☐ Both ☐ Neither ☐

7. How much priority should each of the following water uses be given?

	High priority	Moderate priority	Low priority	pr
Agriculture	☐	☐	☐	
Domestic	☐	☐	☐	
Mining	☐	☐	☐	
Industry	☐	☐	☐	
Fish and Wildlife	☐	☐	☐	
Municipal	☐	☐	☐	
Recreational	☐	☐	☐	
Other (specify)_____	☐	☐	☐	

8. Do you feel a high priority should be placed on determining water rights in all areas of the state?
Yes ☐ No ☐ No opinion ☐

9. Indicate which of the following most closely represents your position concerning the hunting of Montana's game animals. (Choose one)

I am a hunter	☐
I do not hunt but do not oppose it	☐
I object to hunting because of poor experiences with hunters	☐
I object to hunting because of other reasons	☐

10. Do you make special efforts or trips just to observe wildlife?
Yes ☐ No ☐

BACKGROUND INFORMATION

1. Sex: Male ☐ Female ☐

2. The name of the county I live in is: _____

3. The area I live in is:
Urban ☐ Suburban ☐ Rural ☐

4. My age is in the following bracket:
25 or under ☐ 26-45 ☐ 46-65 ☐ over 65 ☐

5. Choose the category which best identifies your occupation:
Housewife ☐ Student ☐ Retired ☐ Labor ☐ Agriculture ☐
Business ☐ Government ☐ Professional & Technical ☐ Forestry, Mining, Natural Resource

III
Energy Consumption in Montana
Projections to 1990

Introduction

Numerous studies have been done and many more are in progress; all examining some aspect of the energy dilemma. Although many involve Montana, they are primarily focused on the state's position in the national energy picture and few have examined the future domestic energy needs of the state. Recognizing the importance of analyzing and understanding Montana's own energy requirements, the Montana Energy Advisory Council has initiated a program designed to fill this gap. This paper summarizes the progress of this work and presents the initial energy consumption projections for Montana.

It should be noted that we presently are at the beginning stages of analyzing the available data and, therefore, have not attempted to develop a comprehensive energy projections model but rather have used some rudimentary tools in order to form a base from which more sophisticated projections can be made. Since many factors have not been included in the analysis, and since great uncertainty surrounds future energy prices, technology and availability, these projections should not be interpreted as absolute forecasts of future energy use in Montana, but, rather, as ball-park estimates of Montana's future consumption.

Although this initial analysis is simple, it has yielded some insight into the future energy use of Montana. This paper outlines the methodology employed, the relationships used for the projections, and provides graphical presentation of the forecasts.

Methodology

From the onset of the project, it was decided that the analysis should be straightforward and understandable. Therefore, we have opted not to construct a large and sophisticated regional energy supply and demand model but rather have concentrated on understanding Montana consumption, an admittedly small portion of the regional energy picture, but perhaps the most important aspect at the moment for those whose primary interest is the Montana energy situation.

Data Base

The primary data source for most of the energy and fuels data was the United States Bureau of Mines. This allowed the use of a consistent, long-term data base from which to make projections. Other sources used to supplement this include the Montana Public Service Commission, the Federal Power Commission and the two principal utilities in Montana. Approximately 200 data series were automated to facilitate this analysis and these are listed in Appendix 2.

Hypothesis

The principal projection hypothesis was that the level of consumption of a particular energy fuel is determined by the number of consumers, the temperature during the year, the price per unit of the fuel and the price per unit of competing energy sources. It is clear that the level of energy consumption can be partitioned into two principal components: (1) average consumption per consumer, and (2) the number of consumers. The number of consumers is related to the population level which in turn is primarily influenced by the level of economic

activity. To some extent, the average consumption per consumer is also determined by the level of economic activity, but, more importantly, theory tells us it should be functionally related to the price of the fuel, the price of competing fuels and the temperature for a given year. The price relationships influence appliance saturation and usage, as well as the level of conservation effort. Trying to estimate a single relationship that could clearly separate these effects would only complicate the picture and, since population projections frequently change, we have concentrated our initial efforts on explaining consumption per capita and then, by using population projections for Montana, generating total consumption estimates. Therefore, equations of the following form were estimated:

$$(1) \quad Ci/POP = a_o + a_1 T + a_2 HDD + a_3 P_i + a_4 P_j$$

Where:
- Ci/POP = consumption per capita of energy source i.
- T = time.
- HDD = heating degree days.
- Pi = price per unit of energy source i.
- Pj = price per unit of competing energy source j.

A priori, we expect an inverse relationship between consumption and the price of the fuel and a positive relationship between consumption and the price of competing fuels. This means that as the price of electricity increases, consumption of electricity should fall and consumption of competing energy sources, such as natural gas, should increase. The price variables are the prices paid by each group of consumers, i.e., for industrial natural gas consumption per capita, the industrial natural gas and electricity prices were used. The household natural gas price, deflated by the U.S. Consumer Price Index, was used in the household/commercial natural gas equation. The industrial price was deflated

by the Wholesale Price Index. Both the time-trend variable (entered to proxy for variables not easily quantified, such as appliance saturation, standard of living, etc.) and the number of heating degree days should exert a positive influence on the level of consumption.

Preliminary analysis indicated a positive correlation between the level of consumption and both price variables for many of the electricity and natural gas equations. This unexpected result can be explained by the fact that the real price of both fuels declined during the 1960's while consumption of each increased. To circumvent this problem, an alternate form of Equation (1) was estimated for the electricity and natural gas sectors and is given below:

$$(2) \quad Ci/POP = bo + b_1 T + b_2 HDD + b_3 GP/EP$$

Where: GP = real price per unit of natural gas.
EP = real price per unit of electricity.

The ratio GP/EP has increased steadily during the past years indicating that the price of natural gas has been increasing faster than the price of electricity. The regression results should indicate a positive correlation between this ratio and the consumption of electricity and a negative relationship for the natural gas equation. The price ratio entered in the equation was scaled to account for the relative BTUs available from each fuel by multiplying by .0034.[1/]

1/ Clearly this only served to scale the estimated coefficient on the price ratio which means that without the adjustment the coefficient would be $b_3/.0034$.

A third equation form, utilizing time-trend analysis, was also estimated. By the nature of time-trend analysis, projections of the trend will yield an accurate forecast of the future if the historical relationships hold in the future. Thus, time-trend forecasts are based on an assumption that the forces which have produced certain trends in energy consumption in the past will continue, thus producing similar changes in the future. If these underlying forces, such as economic activity, population level, prices and so forth, do not follow their historical growth paths, a time-trend projection of the future will not be valid. This problem is particularly relevant to analysis of energy use in Montana. During most of the 1960's, the total population of Montana decreased, while total energy usage increased, which implies that the major contributory factor toward higher levels of energy use was not more consumers but more consumption per capita. This implies that if Montana had undergone substantial population growth during the 1960's, total energy use would have been even greater. Given there has been increased population during the 1970's, a trend of total consumption over time estimated for the 1960's would underestimate consumption in the 1970's since this simple trend would account for some of the increased consumption per person but would not include the greater number of consumers. By attempting to explain consumption per capita rather than the level of consumption as a time trend, we have tried to circumvent this problem.

In addition to the time trend, the number of heating degree days (a measure of annual temperature variation) was included to account for some of the year-to-year fluctuations in consumption. This variable indicates the number of degree days that the temperature was below a certain level. Therefore, the

greater the number of degree days, the colder was that particular year. The number used in this study is for the Billings area. The ability of temperature to influence the time trend can be shown by examining the implied annual growth rates calculated from electricity consumption data for Montana. For this explanatory comparison only, growth rates were calculated by using the beginning point and end point consumption only and do not take into account fluctuations which occurred during the intervening years. Three growth rates for three different time intervals and the number of heating degree days in beginning and ending years are given in Table 12.

Table 12

Annual Growth Rate in Electricity Consumption vs. Annual Temperature Variation Montana

Interval	Beginning Year Electricity Consumption (million kwhr)	Ending Year Electricity Consumption (million kwhr)	Implied Annual Growth Rate	Beginning Year Heating Degree Days	Endin Year Hea Degree D
1968-1972	8,555	10,224	+ 4.5%	6,657	7,952
1968-1973	8,555	9,343	+ 1.8%	6,657	7,004
1970-1973	10,020	9,343	- 2.3%	7,652	7,004

Sources: Edison Electric Institute and the National Oceanographic and Atmospheri Administration.

The first interval indicates an annual electricity growth rate of 4.5 percent, but the beginning year, 1968, was warm relative to the ending year, 1973

A smaller difference in temperature and a correspondingly smaller growth rate is indicated for the interval 1968-1973. Using 1970 as a beginning year, a cold year, and 1973 as an ending year, a warmer year, results in a negative growth rate of -2.3 percent. This suggests that one of the principle determinants of the year-to-year fluctuations in energy consumption is the average weather experienced during the year. Therefore, we have included the number of heating degree days as one independent variable in the analysis. The time trend-equation with the temperature variable is given below:

$$(3) \quad Ci/POP = Co + c_1 T + c_2 HDD$$

Although we cannot forecast future annual weather patterns, including the temperature variable in the equation reduces the variation attributed to the time trend and improves the statistical fit of the estimated equations.

Multiple-regression analysis was used to estimate Equations (1) and (2) for total consumption of electricity, natural gas and petroleum, as well as use of each fuel by the household/commercial and industrial sectors. Since there is a large difference in regional natural gas prices, relationships were also estimated for the eastern and western regions of the state. A list of the counties in each region is given in Appendix 3. Equation (3) was also estimated for those fuels and uses mentioned above and for total energy consumption. Various equations other than those shown above, but using no additional variables, were also estimated. Equations were estimated over both the 1960-1974 period and the 1967-1974 period. The estimated equations that contained significant coefficients (using the student-T test) are listed in Appendix 4.

Consumption Projections

Economic theory suggests that one of the major determinants of consumption is price. However, one of the critical assumptions of forecasting is that we can predict the explanatory variables better than we can explain the dependent variable. For example, assume we are trying to forecast X and we know X = 2Y. If we can only project Y within $\pm$ 20 percent but can predict X within $\pm$ 10 percent, then it makes sense to project X directly. Projecting Y first would be like determining the number of people by counting the number of feet and dividing by two. Since we know little about future energy prices at this stage, and because Equation (3) fit the data better, we have decided to base these initial projections on the time-trend equation form. The equations used for the projections are given in Table 13. The number below each coefficient is the student-T statistic and is an indicator of the degree of confidence in the parameter. The Durbin-Watson statistic is a test for serial correlation. The key to the variables is provided in Table 14.

A few factors should be kept in mind when analyzing the projections. Foremost is the fact that these are simple time-trend equations and such factors as new technology, availability of energy, fuel substitution and relative BTU efficiency have not been explicitly taken into account. Relative fuel prices are also assumed to change as they have in the past. Although many promising areas of energy conservation are being explored, they have not been factored into this base forecast. It should also be stressed that these projections assume that there will be no future supply constraints.

Table 13

Per Capita Energy Projection Equations - Montana

.able	Units	Period	N	Constant	Time	HDD	$\bar{R}$	D.W.
ERGY	thous BTUs per person	1960-1974	15	.13	.0059** (10.83)	.00001** (1.91)	.93	1.67
OMENERGY	thous BTUs per person	1960-1974	15	.06	.0008** (4.16)	.00001** (2.47)	.74	1.71
NERGY	thous BTUs per person	1960-1974	15	.00	.0030** (6.56)	.00001* (1.32)	.82	1.50
ECT	thous kwhr per person	1967-1974	8	- 4.49	.2863** (2.17)	.0016* (1.89)	.49	1.43
OMELECT	thous kwhr per person	1967-1974	8	- .22	.2029** (19.67)	.0001 (1.11)	.98	2.06
ELECT	thous kwhr per person	1967-1974	8	- 4.29	.0920* (1.61)	.0015** (2.07)	.28	1.45
S	thous mcf per person	1967-1974	8	-19.31	2.1016** (3.45)	.0108** (3.63)	.78	2.28
OMGAS	thous mcf per person	1967-1974	8	17.88	.2801 (1.27)	.0042** (3.89)	.70	2.45
GAS	thous mcf per person	1967-1974	8	-38.35	1.6471** (3.67)	.0067** (3.07)	.76	2.00
COMGAS	thous mcf per person	1967-1974	8	15.72	.1690* (1.51)	.0054** (3.38)	.58	2.02
COMGAS	thous mcf per person	1967-1974	8	13.13	.4472** (2.47)	.0026** (2.94)	.66	2.71
IDGAS	thous mcf per person	1967-1974	8	-96.11	3.2454** (2.64)	.0086** (4.87)	.81	2.30
IDGAS	thous mcf per person	1967-1974	8	-17.52	1.0458** (2.77)	.0061** (3.28)	.71	1.91
TRO	thous bar per person	1960-1974	15	18.95	.5150** (6.41)		.74	1.98

*Significant at the 95 percent level
Significant at the 90 percent level

rce: Montana Energy Advisory Council.

Table 14

Key to Abbreviations

TENERGY = total energy consumption per capita.

HHCOMENERGY = household/commercial energy consumption per capita.

INDENERGY = industrial energy consumption per capita.

TELECT = total electricity consumption per capita.

HHCOMELECT = household/commercial electricity consumption per capita.

INDELECT = industrial electricity consumption per capita.

TGAS = total natural gas consumption per capita.

HHCOMGAS = household/commercial natural gas consumption per capita.

INDGAS = industrial natural gas consumption per capita.

EHHCOMGAS = eastern region total natural gas consumption per capita.

WHHCOMGAS = western region natural gas consumption per capita.

EINDGAS = eastern region industrial natural gas consumption per capita.

WINDGAS = western region industrial natural gas consumption per capita

TPETRO = total petroleum consumption per capita.

The future consumption per capita estimates are presented in Table 15 with the implied compounded annual growth rates for the 1974-1990 interval. Total energy consumption per capita is projected to increase 27 percent over the next 15 years with household/commercial and industrial consumption increasing 18 percent and 37 percent, respectively. A much different picture resulted for the electricity. Total electricity consumption per capita is projected to increase 53 percent and household/commercial consumption per capita should increase 69 percent while industrial consumption per capita increases only 15 percent. Industrial consumption per capita of natural gas is projected, based on historical trends, to grow by 63 percent by 1990, but household/commercial will grow by only 15 percent. Total natural gas consumption per capita increases 40 percent. When the state natural gas consumption per capita was separated into an east and west component, diverse results were obtained. Household/commercial consumption in the western region is projected to increase 23.5 percent as compared to the increase in the eastern region of only 11.7 percent. The opposite occurred in the industrial sector with consumption per capita increasing 40 percent in the west, but 138 percent in the east. Per capita consumption of petroleum products is projected to increase 20 percent by 1990. It should be noted that these projections have not included the effects of interfuel substitution and price changes. If the cost of using one fuel increases to such a level to make it economically feasible to switch to another fuel, the consumption per capita of each fuel will accordingly decrease and increase, respectively. Most industrial consumers in Montana, faced by natural gas curtailments, have contingency plans to convert, or are in the process of converting, from natural gas to either coal or electricity. Rapid price increases in all energy sources will also cause decreases in consumption. Estimates of this price effect range from a decrease

Table 15

Projections of Per Capita Energy Consumption in Montana, 1974-1990
(Numbers in Parenthesis are in Millions of BTUs Per Person)

Variable	Units	1974	1975	1980	1985	1990	Average Annual Growth Rate (percent)
TENERGY	Million BTUs per person	350.0	355.5	385.2	414.9	444.6	1.5
HHCOMENERGY	Million BTUs per person	108.3	115.8	120.0	124.2	128.4	1.1
INDENERGY	Million BTUs per person	121.8	121.8	136.7	151.6	166.5	2.0
TELECT	Thousand Kwhr per person	14.2 (48.4)	17.6 (60.0)	19.0 (64.8)	20.4 (69.6)	21.8 (74.4)	2.7
HHCOMELECT	Thousand Kwhr per person	5.2 (17.7)	5.8 (19.8)	6.8 (23.2)	7.8 (26.6)	8.8 (30.0)	3.3
INDELECT	Thousand Kwhr per person	9.0 (30.7)	9.1 (31.0)	9.5 (32.4)	10.0 (34.1)	10.4 (35.5)	.9
TGAS	Thousand MCF per person	104.3 (104.3)	114.3 (114.3)	124.8 (124.8)	135.3 (135.3)	145.8 (145.8)	2.1
HHCOMGAS	Thousand MCF per person	52.2 (52.2)	55.9 (55.9)	57.3 (57.3)	58.7 (58.7)	60.1 (60.1)	.9
INDGAS	Thousand MCF per person	48.0 (48.0)	53.4 (53.4)	61.6 (61.6)	69.8 (69.8)	78.1 (78.1)	3.1
EHHCOMGAS	Thousand MCF per person	55.6 (55.6)	59.6 (59.6)	60.4 (60.4)	61.2 (61.2)	62.1 (62.1)	.7
WHHCOMGAS	Thousand MCF per person	40.8 (40.8)	43.7 (43.7)	45.9 (45.9)	48.2 (48.2)	50.4 (50.4)	1.3
EINDGAS	Thousand MCF per person	41.9 (41.9)	51.1 (51.1)	67.3 (67.3)	83.5 (83.5)	99.8 (99.8)	5.6
WINDGAS	Thousand MCF per person	49.5 (49.5)	53.5 (53.5)	58.8 (58.8)	64.0 (64.0)	69.3 (69.3)	2.1
TPETRO	Thousand Bals. per person	33.3 (186.8)	34.4 (192.6)	34.9 (195.4)	37.5 (210.0)	40.1 (224.4)	1.2

[1] Computed from the formula: $\left(\frac{\text{1990 consumption per capita}}{\text{1974 consumption per capita}}\right)^{.0625}$

Source: Montana Energy Advisory Council.

of 1.5 percent to .5 percent in consumption for a 1.0 percent increase in price.

Projections of total consumption were calculated by combining the consumption per capita forecasts with the state population projections in Table 16 provided by the Department of Community Affairs. The results are shown in Table 17.

Table 16

Montana Population Projections, 1975-1990
(In Thousands)

1975	747.4
1980	783.1
1985	845.6
1990	906.0

Source: Montana Futures Process, Research and Information Systems Division, Montana Department of Community Affairs, July 1976.

Table 17

Projections of Energy Consumption in Montana, 1974-1990
(Numbers in Parenthesis are in Trillions of BTUs)

Variable	Units	1974	1975	1980	1985	1990	Average Annu Growth Rat (Percent
TENERGY	Trillion BTUs	257.9	265.7	301.6	350.8	402.8	2.8
HHCOMENERGY	Trillion BTUs	79.8	86.5	94.0	105.0	116.3	2.4
INDENERGY	Trillion BTUs	89.8	91.0	107.0	128.2	150.8	3.3
TELECT	Thousand Kwhr	10456 (35.7)	13154 (44.9)	14879 (50.8)	17250 (58.8)	19751 (67.4)	4.1
HHCOMELECT	Thousand Kwhr	3812 (13.0)	4335 (14.8)	5325 (18.2)	6596 (22.5)	7973 (27.2)	4.7
INDELECT	Thousand Kwhr	6619 (22.6)	6801 (23.2)	7439 (25.4)	8456 (28.8)	9422 (32.1)	2.2
TGAS	Thousand MCF	78135 (78.1)	85428 (85.4)	97731 (97.7)	114410 (114.4)	132095 (132.1)	3.3
HHCOMGAS	Thousand MCF	42873 (42.9)	41780 (41.8)	44871 (44.9)	49637 (49.6)	54451 (54.4)	1.5
INDGAS	Thousand MCF	32082 (32.1)	39911 (39.9)	48239 (48.2)	59023 (59.0)	70759 (70.7)	5.1
EHHCOMGAS	No Projections Made						
WHHCOMGAS	No Projections Made						
EINDGAS	No Projections Made						
WINDGAS	No Projections Made						
TPETRO	Thousand Bals.	24575 (137.6)	24170 (135.3)	27342 (153.1)	31701 (177.5)	36298 (203.3)	2.5

1/ Computed by the formula: $\left(\frac{\text{1990 consumption}}{\text{1974 consumption}}\right)^{.0625}$

Source: Montana Energy Advisory Council.

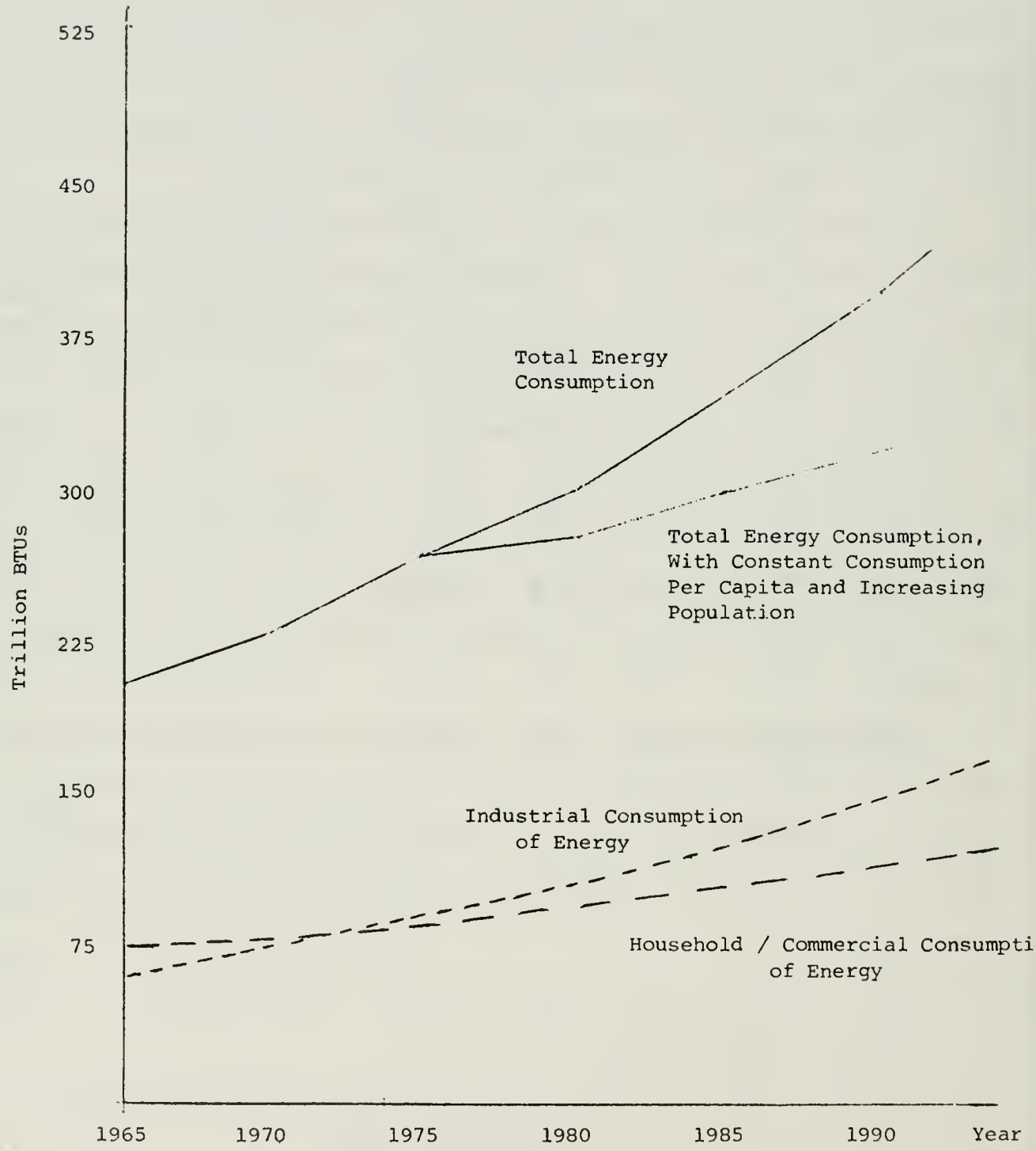
Total energy consumption, depicted in Figure 153, is projected to increase by 56 percent by 1990. Industrial consumption rises at a faster rate than does the household/commercial consumption of energy. The lower solid line in Figure 153 shows the effect of keeping consumption per capita constant at the 1974 level and allowing population to increase. Using constant energy consumption per capita, the increase in total consumption is reduced by half.

Figure 154 portrays the growth in electricity consumption and indicates an increase of 89 percent by 1990. This figure also shows the household/commercial sector increasing at a rate twice as fast as the industrial sector and indicates the effect of constant per capita consumption of electricity. This results in a 23 percent increase in electricity consumption by 1990 over 1974.

Natural gas consumption is graphed in Figure 155 and indicates a projected increase of 69 percent by 1990. The much lower consumption due to constant consumption per capita is also shown and indicates a 21 percent gain in natural gas consumption attributable to the expected increase in Montana's population by 1990.

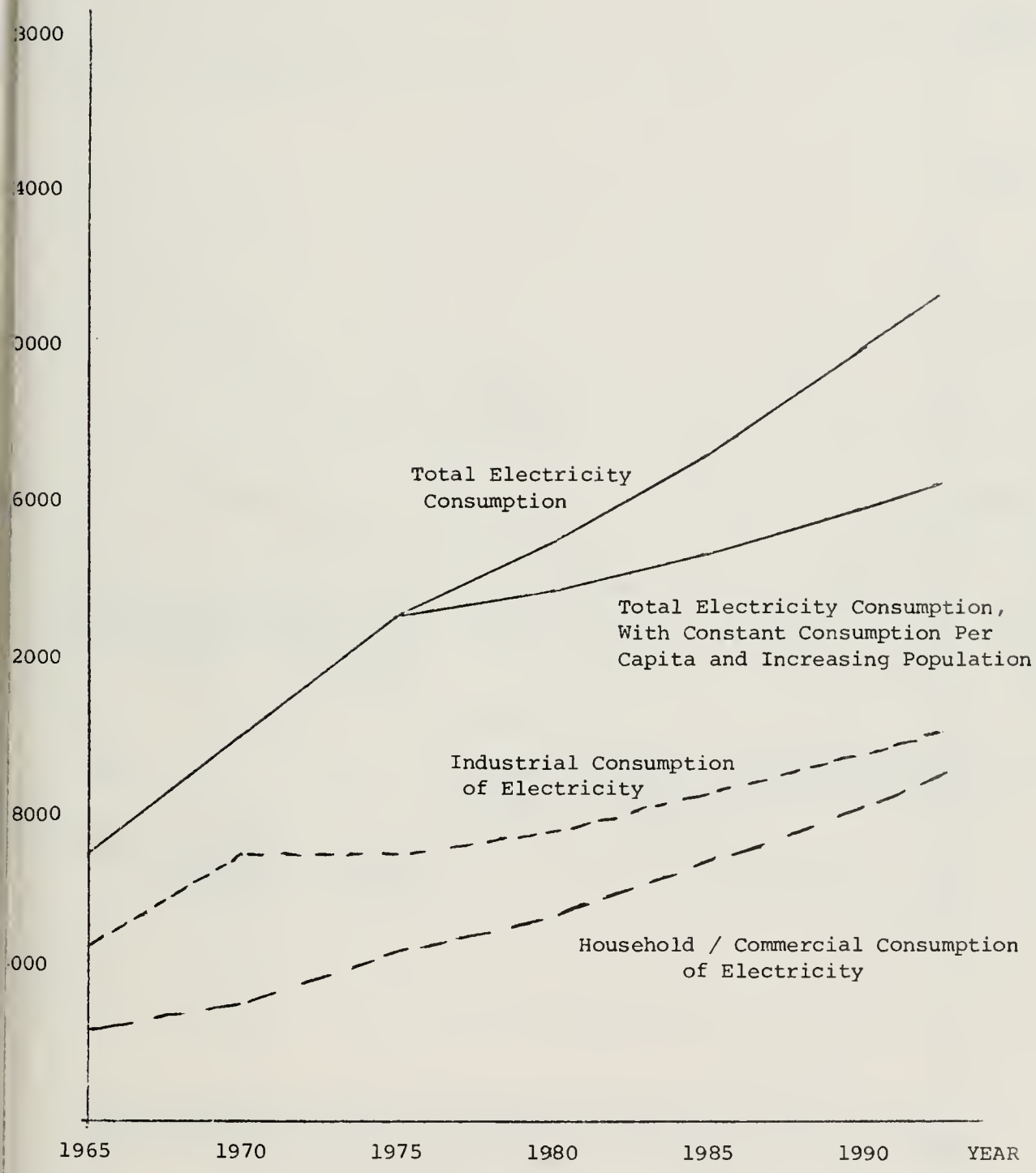
Projections for the final sector, petroleum use, are shown in Figure 156. The effect of holding consumption per capita constant decreases the percentage increase from 48 percent to 23 percent. The prospects of higher petroleum prices, Canadian oil curtailments or another OPEC oil embargo could substantially lower these projections.

fig. 153 Total Energy Consumption in Montana, Historical and Projected, 1965-1990



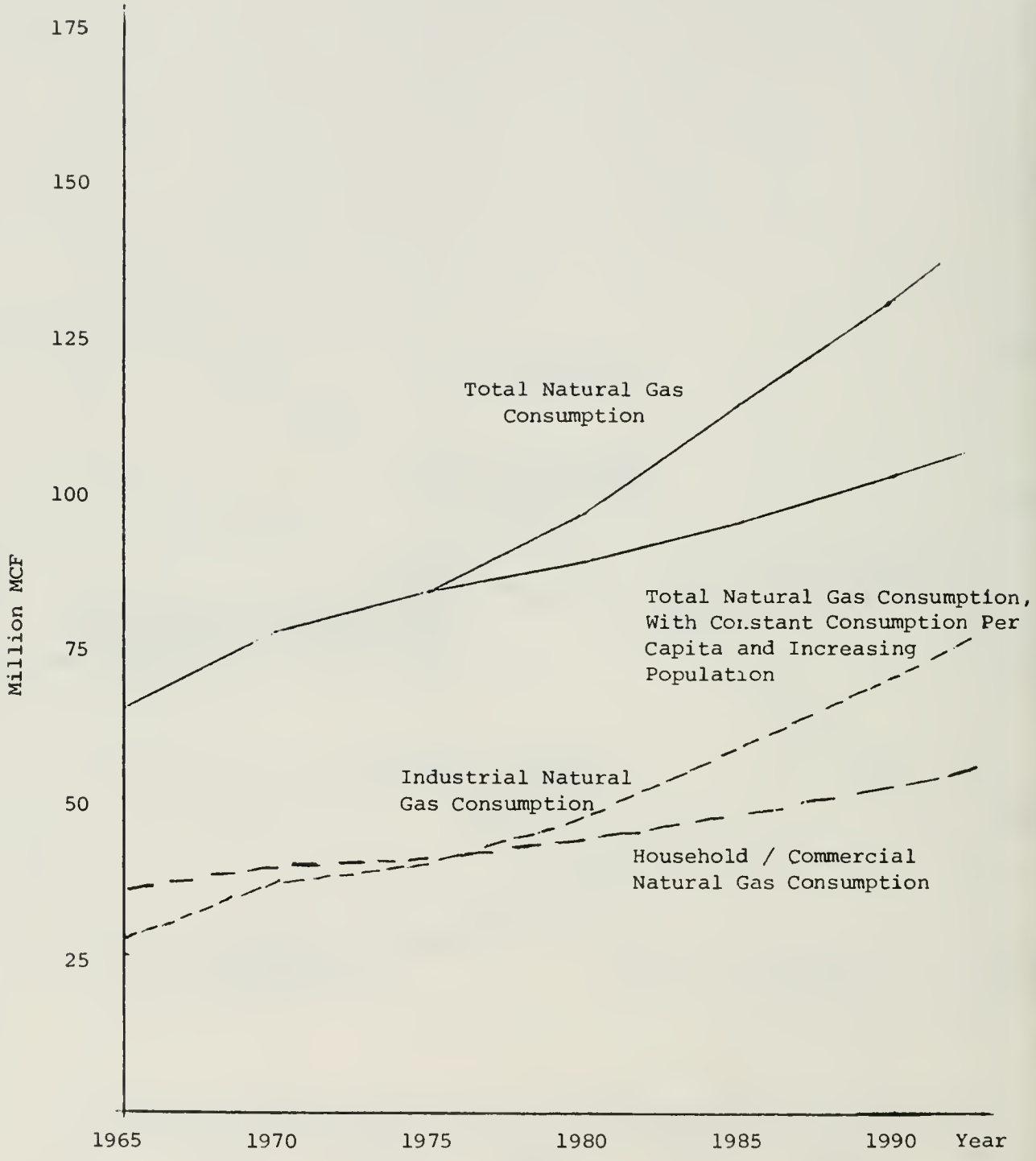
Source: Montana Energy Advisory Council.

fig. 154 Electricity Consumption in Montana, Historical and Projected, 1965-1990



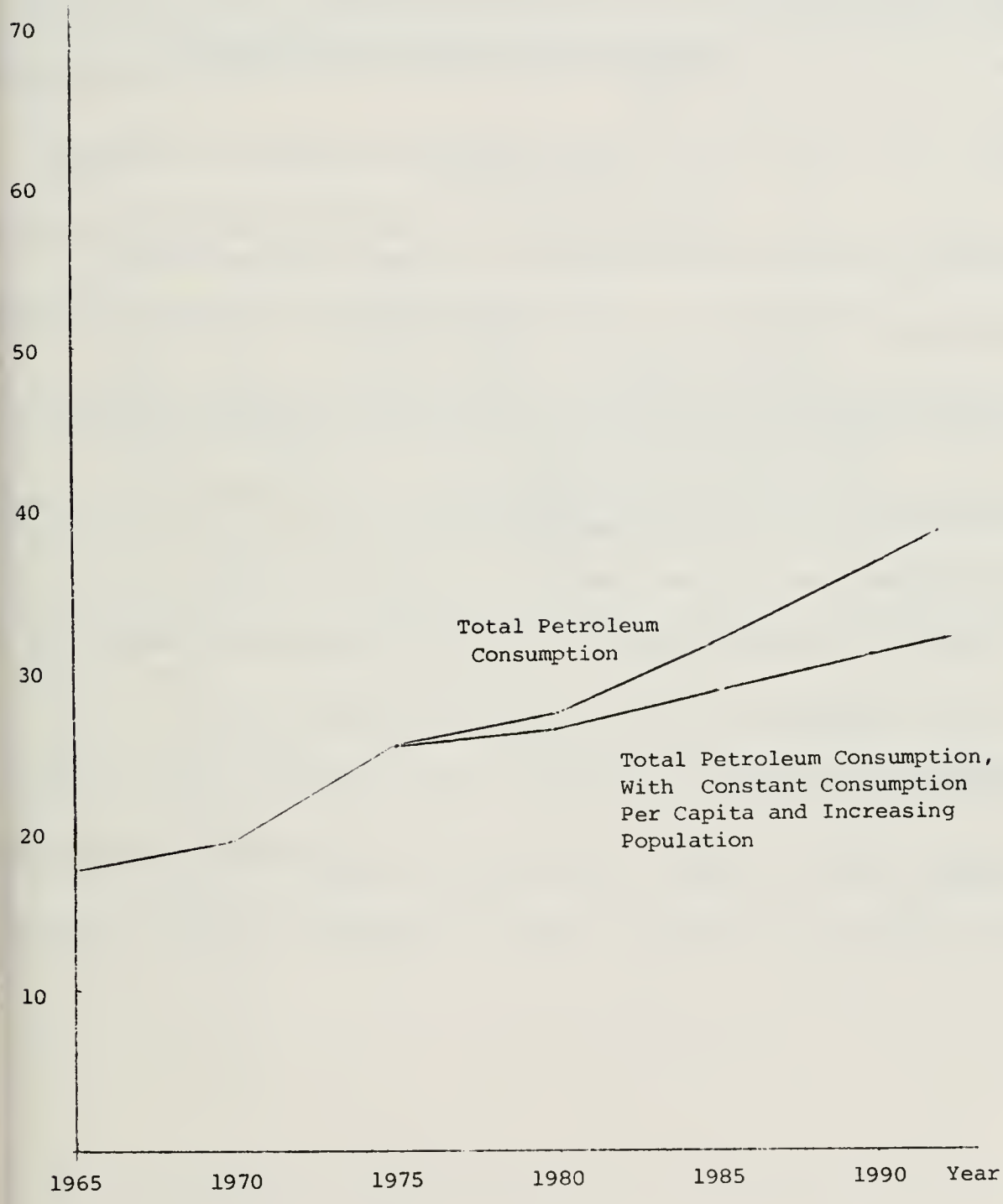
Source: Montana Energy Advisory Council.

fig. 155 Natural Gas Consumption in Montana, Historical and Projected, 1965-1990



Source: Montana Energy Advisory Council.

fig. 156 Petroleum Consumption in Montana, Historical and Projected, 1965-1990



Source: Montana Energy Advisory Council.

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APPENDIX 2

Montana Energy Advisory Council Data Bank

BLS = U.S. Bureau of Labor Statistics

DCA = Montana Department of Community Affairs

DOFREV = Montana Department of Revenue

EEI = Edison Electric Institute

MESA = Montana Employment Security Division, Department of Labor and Industry

MOILGAS = Montana Oil and Gas Conservation Division, Department of Natural Resources and Conservation

MPSC = Montana Public Service Commission

NOAA = National Oceanographic and Atmospheric Administration

USBOM = U.S. Bureau of Mines

MONTANA ENERGY ADVISORY COUNCIL DATA BANK
DOCUMENTATION

AUGUST 3, 1976

SERIES	LABEL	DESCRIPTION	QTR	MON	ANN	UNITS	SOURCE	VARB EQU
1	MTCOALC	MONTANA COAL CONSUMPTION IN TONS				THOUS TONS	USMOM	
2	MTPETROC	MONTANA PETROLEUM CONSUMPTION IN BARRELS				THOUS BALS	USBOM	
3	MTGASC	MONTANA GAS CONSUMPTION IN CUBIC FEET				MIL CU FT	USBOM	
4	MTHYDROC	MONTANA HYDRO POWER CONSUMPTION IN KWHR				MIL KWHR	USBOM	
5	MTELECTC	MONTANA ELECTRICITY DISTRIBUTED IN KWHR				MIL KWHR	USBOM	
6	MTCOAL*	MONTANA COAL CONSUMPTION IN BTU				TRIL BTU	USBOM	
7	MTPETRO*	MONTANA PETROLEUM CONSUMPTION IN BTU				TRIL BTU	USBOM	
8	MTGAS*	MONTANA GAS CONSUMPTION IN BTU				TRIL BTU	MPSC	
9	MTHYDRO*	MONTANA HYDROPOWER CONSUMPTION IN BTU				TRIL BTU	USBOM	
10	MTGRS*	MONTANA GROSS ENERGY CONSUMPTION IN BTU				TRIL BTU	USBOM	
11	MTELECT*	MONTANA ELECTRICITY DISTRIBUTED IN BTU				TRIL BTU	USBOM	
12	MTNETEG*	MONTANA NET ENERGY CONSUMPTION IN BTU				TRIL BTU	USBOM	
13	MHHCOAL	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF COAL				THOUS TONS	USBOM	
14	MHHPETRO	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM	
15	MHHGAS	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF NATURAL GAS				MIL CU FT	USBOM	
16	MHHELECT	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF ELECTRICITY				MIL KWHR	USBOM	
17	MHHCOAL*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF COAL IN BTU				TRIL BTU	USBOM	
18	MHHPETR*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM	
19	MHHGAS*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF NATURAL GAS IN BTU				TRIL BTU	MPSC	
20	MHHGRCON	MONTANA HOUSEHOLD AND COMMERCIAL GROSS CONSUMPTION IN BTU				TRIL BTU	USBOM	
21	MHHELCT*	MONTANA HOUSEHOLD AND COMMERCIAL ELECTRICITY CONSUMPTION IN BTU				TRIL BTU	USBOM	
22	MHHNET*	MONTANA HOUSEHOLD AND COMMERCIAL NET CONSUMPTION IN BTU				TRIL BTU	USBOM	
23	MIDCOAL	MONTANA INDUSTRIAL COAL CONSUMPTION				THOUS TONS	USBOM	
24	MIDPETRO	MONTANA INDUSTRIAL PETROLEUM CONSUMPTION				THOUS BALS	USBOM	
25	MIDGAS	MONTANA INDUSTRIAL NATURAL GAS CONSUMPTION				MIL CU FT	USBOM	
26	MIDELECT	MONTANA INDUSTRIAL ELECTRICITY CONSUMPTION				MIL KWHR	USBOM	
27	MIDCOAL*	MONTANA INDUSTRIAL COAL CONSUMPTION IN BTU				TRIL BTU	USBOM	
28	MIDPETR*	MONTANA INDUSTRIAL PETROLEUM CONSUMPTION IN BTU				TRIL BTU	USBOM	
29	MIDGAS*	MONTANA INDUSTRIAL NATURAL GAS CONSUMPTION IN BTU				TRIL BTU	MPSC	
30	MIDGRCON	MONTANA INDUSTRIAL GROSS CONSUMPTION				TRIL BTU	USBOM	
31	MIDELET*	MONTANA INDUSTRIAL ELECTRICITY CONSUMPTION IN BTU				TRIL BTU	USBOM	
32	MIDNET*	MONTANA INDUSTRIAL NET ENERGY CONSUMPTION IN BTU				TRIL BTU	USBOM	
33	MTRPETRO	MONTANA TRANSPORTATION CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM	
34	MTRGAS	MONTANA TRANSPORTATION CONSUMPTION OF NATURAL GAS				MIL CU FT	USBOM	
35	MTRELECT	MONTANA TRANSPORTATION OF ELECTRICITY				MIL KWHR	USBOM	
36	MTRPETR*	MONTANA TRANSPORTATION CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM	
37	MTRGAS*	MONTANA TRANSPORTATION CONSUMPTION OF NATURAL GAS IN BTU				TRIL BTU	USBOM	
38	MTRGR*	MONTANA TRANSPORTATION GROSS CONSUMPTION OF ENERGY				TRIL BTU	USBOM	
39	MTRELET*	MONTANA TRANSPORTATION ELECTRICITY CONSUMPTION IN BTU				TRIL BTU	USBOM	
40	MTRNET*	MONTANA TRANSPORTATION NET ENERGY CONSUMPTION				TRIL BTU	USBOM	
41	MELCOAL	MONTANA ELECTRIC POWER CONSUMPTION OF COAL				THOUS TONS	USBOM	
42	MELPETRO	MONTANA ELECTRIC POWER CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM	
43	MELGAS	MONTANA ELECTRIC POWER CONSUMPTION OF NATURAL GAS				MIL CU FT	USBOM	
44	MELHYDR	MONTANA ELECTRIC POWER FROM HYDRO				MIL KWHR	USBOM	
45	MELCOAL*	MONTANA ELECTRIC POWER CONSUMPTION OF COAL IN BTU				TRIL BTU	USBOM	
46	MELPETR*	MONTANA ELECTRIC POWER CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM	
47	MELGAS*	MONTANA ELECTRIC POWER CONSUMPTION OF NATURAL GAS IN BTU	5			TRIL BTU	USBOM	
48	MELHYDR*	MONTANA ELECTRIC POWER CONSUMPTION OF HYDROELECTRIC IN BTU				TRIL BTU	USBOM	
49	MELGROS*	MONTANA ELECTRIC POWER GROSS ENERGY CONSUMPTION				TRIL BTU	USBOM	

SERIES	LABEL	DESCRIPTION	QTR	MON	ANN	UNITS	SOURCE	VARS	EQU
51	MMSPETR*	MONTANA MISCELLANEOUS PETROLEUM CONSUMPTION IN BTU				TRIL BTU	USBOM		
52	MMSGROS*	MONTANA MISCELLANEOUS GROSS ENERGY CONSUMPTION IN BTU				TRIL BTU	USBOM		
53	MMSNET*	MONTANA MISCELLANEOUS NET ENERGY CONSUMPTION IN BTU				TRIL BTU	USBOM		
54	MPETGAS	MONTANA GASOLINE CONSUMPTION				THOUS BALS	USBOM		
55	MPETJET	MONTANA CONSUMPTION OF JET FUEL				THOUS BALS	USBOM		
56	MPETKER	MONTANA CONSUMPTION OF KEROSINE				THOUS BALS	USBOM		
57	MPETDIS	MONTANA CONSUMPTION OF DISTILLATE FUEL OIL				THOUS BALS	USBOM		
58	MPETRES	MONTANA CONSUMPTION OF RESIDUAL FUEL OIL				THOUS BALS	USBOM		
59	MPETLPG	MONTANA CONSUMPTION OF LIQUEFIED PETROLEUM GASES				THOUS BALS	USBOM		
60	MPETASP	MONTANA CONSUMPTION OF ASPHALT				THOUS BALS	USBOM		
61	MPETTOT	MONTANA CONSUMPTION OF PETROLEUM PRODUCTS				THOUS BALS	USBOM		
62	MPETGAS*	MONTANA CONSUMPTION OF GASOLINE IN BTU				TRIL BTU	USBOM		
63	MPETJET*	MONTANA CONSUMPTION OF JET FUEL IN BTU				TRIL BTU	USBOM		
64	MPETKER*	MONTANA CONSUMPTION OF KEROSINE IN BTU				TRIL BTU	USBOM		
65	MPETDIS*	MONTANA CONSUMPTION OF DISTILLATE FUEL OIL IN BTU				TRIL BTU	USBOM		
66	MPETRES*	MONTANA CONSUMPTION OF RESIDUAL FUEL OIL IN BTU				TRIL BTU	USBOM		
67	MPETLPG*	MONTANA CONSUMPTION OF LIQUEFIED PETROLEUM GASES IN BTU				TRIL BTU	USBOM		
68	MPETASP*	MONTANA CONSUMPTION OF ASPHALT IN BTU				TRIL BTU	USBOM		
69	MPETTOT*	MONTANA PETROLEUM CONSUMPTION IN BTU				TRIL BTU	USBOM		
70	MHHKER	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF KEROSINE				THOUS BALS	USBOM		
71	MHHDIS	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF DISTILLATE FUEL OIL				THOUS BALS	USBOM		
72	MHHRES	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF RESIDUAL FUEL OIL				THOUS BALS	USBOM		
73	MHHLPG	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF LPG				THOUS BALS	USBOM		
74	MHHASP	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF ASPHALT				THOUS BALS	USBOM		
75	MHHTOT	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM		
76	MHHKER*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF KEROSINE				TRIL BTU	USBOM		
77	MHHDIS*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF DISTILLATE FUEL IN BTU				TRIL BTU	USBOM		
78	MHHRES*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF RESIDUAL FUEL IN BTU				TRIL BTU	USBOM		
79	MHHLPG*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF LPG IN BTU				TRIL BTU	USBOM		
80	MHHASP*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF ASPHALT IN BTU				TRIL BTU	USBOM		
81	MHHTOT*	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM		
82	MIOKER	MONTANA INDUSTRIAL CONSUMPTION OF KEROSINE				THOUS BALS	USBOM		
83	MIODIS	MONTANA INDUSTRIAL CONSUMPTION OF DISTILLATE FUEL OIL				THOUS BALS	USBOM		
84	MIORES	MONTANA INDUSTRIAL CONSUMPTION OF RESIDUAL FUEL OIL				THOUS BALS	USBOM		
85	MIOLPG	MONTANA INDUSTRIAL CONSUMPTION OF LIQUEFIED PETROLEUM GASES				THOUS BALS	USBOM		
86	MIOTOT	MONTANA INDUSTRIAL CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM		
87	MIOKER*	MONTANA INDUSTRIAL CONSUMPTION OF KEROSINE IN BTU				TRIL BTU	USBOM		
88	MIODIS*	MONTANA INDUSTRIAL CONSUMPTION OF DISTILLATE FUEL OIL IN BTU				TRIL BTU	USBOM		
89	MIORES*	MONTANA INDUSTRIAL CONSUMPTION OF RESIDUAL FUEL OIL IN BTU				TRIL BTU	USBOM		
90	MIOLPG*	MONTANA INDUSTRIAL CONSUMPTION OF LPG IN BTU				TRIL BTU	USBOM		
91	MIOTOT*	MONTANA INDUSTRIAL CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM		
92	MTRGAS	MONTANA TRANSPORTATION CONSUMPTION OF GASOLINE				THOUS BALS	USBOM		
93	MTRJET	MONTANA TRANSPORTATION CONSUMPTION OF JET FUEL				THOUS BALS	USBOM		
94	MTRDIS	MONTANA TRANSPORTATION CONSUMPTION OF DISTILLATE FUEL				THOUS BALS	USBOM		
95	MTRRES	MONTANA TRANSPORTATION CONSUMPTION OF RESIDUAL FUEL OIL				THOUS BALS	USBOM		
96	MTRLPG	MONTANA TRANSPORTATION CONSUMPTION OF LPG				THOUS BALS	USBOM		
97	MTRTOT	MONTANA TRANSPORTATION CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM		
98	MTRGAS*	MONTANA TRANSPORTATION CONSUMPTION OF GASOLINE IN BTU				TRIL BTU	USBOM		
99	MTRJET*	MONTANA TRANSPORTATION CONSUMPTION OF JET FUEL IN BTU				TRIL BTU	USBOM		
100	MTRDIS*	MONTANA TRANSPORTATION CONSUMPTION OF DISTILLATE FUEL IN BTU				TRIL BTU	USBOM		

MONTANA ENERGY ADVISORY COUNCIL DATA BANK
DOCUMENTATION

SERIES	LABEL	DESCRIPTION	QTR	MON	ANN	UNITS	SOURCE	VAR& EQU
101	MTRRES*	MONTANA TRANSPORTATION CONSUMPTION OF RESIDUAL FUEL IN BTU	1			TRIL BTU	USBOM	
102	MTRLPG*	MONTANA TRANSPORTATION CONSUMPTION OF LPG IN BTU				TRIL BTU	USBOM	
103	MTRTOT*	MONTANA TRANSPORTATION CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM	
104	MELDIS	MONTANA ELECTRIC POWER CONSUMPTION OF DISTILLATE FUEL OIL				THOUS BALS	USBOM	
105	MELRES	MONTANA ELECTRIC POWER CONSUMPTION OF RESIDUAL FUEL OIL				THOUS BALS	USBOM	
106	MELTOT	MONTANA ELECTRIC POWER CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM	
107	MELDIS*	MONTANA ELECTRIC POWER CONSUMPTION OF DISTILLATE FUEL OIL IN BTU				TRIL BTU	USBOM	
108	MELRES*	MONTANA ELECTRIC POWER CONSUMPTION OF RESIDUAL FUEL OIL IN BTU				TRIL BTU	USBOM	
109	MELTOT*	MONTANA ELECTRIC POWER CONSUMPTION OF PETROLEUM IN BTU				TRIL BTU	USBOM	
110	MMSDIS	MONTANA MISCELLANEOUS CONSUMPTION OF DISTILLATE FUEL OIL				THOUS BALS	USBOM	
111	MMSRES	MONTANA MISCELLANEOUS CONSUMPTION OF RESIDUAL FUEL OIL				THOUS BALS	USBOM	
112	MMSLPG	MONTANA MISCELLANEOUS CONSUMPTION OF LPG				THOUS BALS	USBOM	
113	MMSTOT	MONTANA MISCELLANEOUS CONSUMPTION OF PETROLEUM				THOUS BALS	USBOM	
114	MMSDIS*	MONTANA MISCELLANEOUS CONSUMPTION OF DISTILLATE FUEL OIL IN BTU				TRIL BTU	USBOM	
115	MMSRES*	MONTANA MISCELLANEOUS CONSUMPTION OF RESIDUAL FUEL OIL IN BTU				TRIL BTU	USBOM	
116	MMSLPG*	MONTANA MISCELLANEOUS CONSUMPTION OF LPG IN BTU				TRIL BTU	USBOM	
117	MMSTOT*	MONTANA MISCELLANEOUS CONSUMPTION OF PETROLEUM				TRIL BTU	USBOM	
118	MGASST	MONTANA CONSUMPTION OF NATURAL GAS.STATE DATA SOURCES				MIL CU FT	MPSC	
119	MHHGASST	MONTANA HOUSEHOLD AND COMMERCIAL CONSUMPTION OF GAS.STATE DATA SOURCES				MIL CU FT	MPSC	
120	MIDGASST	MONTANA INDUSTRIAL CONSUMPTION OF GAS. STATE DATA SOURCES				MIL CU FT	MPSC	
121	USCRUPRD	U.S. DOMESTIC CRUDE OIL PRODUCTION				MIL BALS	USBOM	
122	USCRUPR	U.S. AVERAGE WELLHEAD PRICE FOR CRUDE				DOL/BARREL	USBOM	
123	USCRUIM	U.S. IMPORTS OF CRUDE OIL				MIL BALS	USBOM	
124	MCRUPRD	MONTANA PRODUCTION OF CRUDE OIL				THOUS BALS	M OILGAS	
125	UNETIMFI	U.S. NET IMPORTS OF FINISHED PRODUCTS				MIL BALS	USBOM	
126	MCRUPR	MONTANA WELLHEAD PRICE OF CRUDE OIL				DOL/ BARREL	MPSC	
127	MCRUPRD1	MONTANA PRODUCTION OF CRUDE OIL. OTHER STATE SOURCE				THOUS BALS	USBOM	
128	MCRUPR1	MONTANA CRUDE OIL WELLHEAD PRICE. STATE SOURCE				DOL/BARREL	DOFREV	
129	REFMT	MONTANA CRUDE REFINED IN MONTANA				THOUS BALS	MOILGAS	
130	REFWYO	WYOMING CRUDE REFINED IN MONTANA				THOUS BALS	MOILGAS	
131	REFCAN	CANADA CRUDE REFINED IN MONTANA				THOUS BALS	MOILGAS	
132	REFTOT	TOTAL REFINED CRUDE IN MONTANA				THOUS BAL	MOILGAS	
133	MPROGAS	MONTANA PRODUCTION OF GASOLINE				THOUS BALS	USBOM	
134	USCOALPD	U.S. COAL PRODUCTION				THOUS TONS	USBOM	
135	USCOAL$	U.S. COAL MINEMOUTH PRICE				DOL/TON	USBOM	
136	MBITPRO	MONTANA PRODUCTION OF BITUMINOUS COAL				THOUS TONS	USBOM	
137	MLIGPRO	MONTANA PRODUCTION OF LIGNITE				THOUS TONS	USBOM	
138	MCOALPRO	MONTANA COAL PRODUCTION				THOUS TONS	USBOM	
139	MBIT$	MONTANA AVERAGE BITUMINOUS MINEMOUTH PRICE				DOL/TON	USBOM	
140	MLIG$	MONTANA AVERAGE MINEMOUTH PRICE FOR LIGMITE				DOL/TON	USBOM	
141	MCOAL$	MONTANA AVERAGE MINEMOUTH PRICE FOR COAL				DOL/TON	USBOM	
142	MCOALPRO	MONTANA COAL PRODUCTION				TONS	DOFREV	
143	MCOALPRI	MONTANA AVERGAE MINEMOUTH PRICE OF COAL.DEPARTMENT OF REVENUE				DOL/TON	DOFREV	
144	MELEGEN	MONTANA ELECTRICITY GENERATED				MIL KWHR	FPC	
145	MELPR	AVERAGE PRICE OF ELECTRICITY IN MONTANA				CENTS/KWHR	EEI	
146	MELPRHH	AVERAGE RESIDENTIAL ELECTRICITY PRICE IN MONTANA				CENT/KWHR.	EEI	
147	MELPRCOM	AVERAGE COMMERCIAL ELECTRICITY PRICE IN MONTANA				CENTS/KWHR	EEI	
148	MELPRIND	AVERAGE PRICE FOR INDUSTRIAL ELECTRICITY IN MONTANA				CENTS/KWHR	EEI	
149	MELPRSTR	AVERAGE PRICE OF STREET AAND HIGHWAY ELECTRICITY IN MONTANA				CENTS/KWHR	EEI	

SERIES	LABEL	DESCRIPTION	QTR	MON	ANN	UNITS	SOURCE	VAR& EQU
151	MELPRRR	AVERAGE PRICE OF ELECTRICITY FOR RAILROADS IN MONTANA				CENTS/KWHR	EEI	
152	MELPRINT	AVERAGE PRICE OF ELECTRICITY FOR INTERDEPARTMENTAL SALES IN MONTANA				CENTS/KWHR	EEI	
153	UGASPRWL	U.S. WELLHEAD NATURAL GAS PRICE				CENTS/MCF	USBOM	
154	UGASPRRT	U.S. RETAIL NATURAL GAS PRICE				CENTS/MCF	USBOM	
155	UGASPRRE	U.S. RESIDENTIAL NATURAL GAS PRICE				CENTS/MCF	USBOM	
156	UGASPRCOM	U.S. COMMERCIAL NATURAL GAS PRICE				CENTS/MCF	USBOM	
157	UGASPRIN	U.S. INDUSTRIAL NATURAL GAS PRICE				CENTS/MCF	USBOM	
158	MGASPROD	MONTANA NATURAL GAS PRODUCTION				MIL CU FT	USBOM	
159	MGASPRWL	MONTANA WELLHEAD PRICE OF NATURAL GAS				CENTS/MCK	USBOM	
160	MGASPRRT	MONTANA RETAIL PRICE OF NATURAL GAS				CENTS/MCF	USBOM	
161	MGASPRDL	MONTANA PRICE OF DELIVERED NATURAL GAS				CENTS/MCF	USBOM	
162	MGASPRRE	MONTANA RESIDENTIAL GAS PRICE				CENTS/MCF	USBOM	
163	MGASPRCO	MONTANA PRICE OF COMMERCIAL NATURAL GAS				CENTS/MCF	USBOM	
164	MGASPRIN	MONTANA PRICE OF INDUSTRAIL NATURAL GAS				CENTS/MCF	USBOM	
165	MGASPR01	MONTANA NATURAL GAS PRODUCTION. MONTANA OIL AND GAS CONSERVATION				MIL CU FT	MOILGAS	
166	MGASPR02	MONTANA NATURAL GAS PRODUCTION. DEPARTMENT OF REVNNUE				MIL CU FT	DOFREV	
167	MGASPR1	MONTAN NATURAL GAS PRICE. DEPARTMENT OF REVENUE				CENTS/MCF	DOFREV	
168	MPCRESPR	MONTANA POWER RESIDENTIAL AND COMMERCIAL GAS PRICE				CENTS/MCF	MPSC	
169	MPCINDPR	MONTANA POWER INDUSTRIAL GAS PRICE				CENTS/MCF	MPSC	
170	MPCOTHPR	MONTANA POWER OTHER GAS PRICE				CENTS/MCF	MPSC	
171	MDURESPR	MONTANA-DAKOTA RESIDENTIAL AND COMMERCIAL GAS PRICE				CENTS/MCF	MPSC	
172	MDUINDPR	MONTANA-DAKOTA INDUSTRIAL GAS PRICE				CENTS/MCF	MPSC	
173	MDUOTHPR	MONTANA-DAKOTA OTHER GAS PRICE				CENTS/MCF	MPSC	
174	MPCRESC	MONTANA POWER RESIDENTIAL AND COMMERCIAL GAS CONSUMPTION				THOUS CUFT	MPSC	
175	MPCINDC	MONTANA POWER INDUSTRIAL GAS CONSUMPTION				THOUS CU FT	MPSC	
176	MPCOTHC	MONTANA POWER OTHER GAS CONSUMPTION				THOUS CU FT	MPSC	
177	MPCTOTC	MONTANA POWER TOTAL GAS CONSUMPTION				THOUS CU FT	MPSC	
178	MDURESC	MONTANA-DAKOTA RESIDENTIAL AND COMMERCIAL GAS CONSUMPTION				THOUS CU FT	MPSC	
179	MDUINDC	MONTANA-DAKOTA INDUSTRIAL GAS CONSUMPTION				THOUS CU FT	MPSC	
180	MDUOTHC	MONTANA-DAKOTA OTHER GAS CONSUMPTION				THOUS CU FT	MPSC	
181	MDUTOTC	MONTANA-DAKOTA TOTAL NATURAL GAS CONSUMPTION				THOUS CU FT	MPSC	
182	GFGRESC	GREAT FALLS GAS RESIDENTIAL AND COMMERCIAL GAS CONSUMPTION				THOUS CU FT	MPSC	
183	GFGINDC	GREAT FALLS GAS INDUSTRIAL GAS CONSUMPTION				THOUS CU FT	MPSC	
184	GFGOTHC	GREAT FALLS GAS OTHER CONSUMPTION				THOUS CU FT	MPSC	
185	GFGTOTC	GREAT FALLS GAS TOTAL GAS CONSUMPTION				THOUS CU FT	MPSC	
186	MEMPMAN	MONTANA MANUFACTURING EMPLOYMENT				THOUS	MESD	
187	MNONAG	MONTANA NONAG WAGE AND SALARY EMPLOYMENT				THOUS	MESD	
188	TEMP	HEATING DAYS. BILLINGS				DAYS	NOAA	
189	TIME	TIME TREND						
190	CPI	CONSUMER PRICE INDEX				1967=100	BLS	
191	WPI	WHOLESALE PRICE IDEX				1967=100	BLS	
192	CPIGAS	CONSUMER NATURAL GAS PRICE INDEX 1967=100				1967=100	BLS	
193	CPIELECT	CONSUMER ELECTRICITY PRICE INDEX				1967=100	BLS	
194	CPIGASEL	CONSUMER GAS AND ELECTRIC PRICE INDEX				1967=100	BLS	
195	WPIGAS	WHOLESALE PRICE INDEX FOR GAS FUELS				1967=100	BLS	
196	WPIELECT	WHOLESALE PRICE INDEX FOR ELECTRIC POWER				1967=100	BLS	
197	MDUPOP	POPULATION WITHIN THE MDU SYSTEM				PERSONS	DCA	
198	MPCPOP	POPULATION WITHIN THE MONTANA POWER SYSTEM				PERSONS	DCA	
199	POP	MONTANA POPULATION				PERSONS	DCA	
200	MELRECO	MONTANA COMMERCIAL AND RESIDENTIAL ELECTRICITY PRICE				CENTS/KWHR	EEI	

		1 MTCOAL	2 MTPETR	3 MTGASC	4 MTHYDR	5 MTELEC	6 MTCOAL	7 MTPETR	8 MTGAS*	9 MTHYDR	10 MTGRS
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	952.000	16557.000	56575.000	5801.000	5135.000	19.000	92.400	52.300	91.100	261.100
12	1961- 1	1045.000	17827.000	57645.000	6499.000	5276.000	20.400	99.500	54.000	92.500	272.100
13	1962- 1	1108.000	19278.000	64790.000	6410.000	5559.000	21.500	107.700	56.200	82.000	278.700
14	1963- 1	1066.000	19209.000	68357.000	6012.000	5730.000	20.600	107.600	57.900	78.400	277.700
15	1964- 1	1190.000	19775.000	69928.000	6821.000	6253.000	23.200	110.600	63.900	89.900	296.400
16	1965- 1	1075.000	17953.000	72145.000	8389.000	6892.000	20.700	98.900	68.200	105.500	299.800
17	1966- 1	995.000	19024.000	73365.000	7940.000	7801.000	18.800	104.800	67.800	95.900	295.500
18	1967- 1	968.000	17955.000	66237.000	8704.000	7530.000	18.100	97.500	65.400	102.800	286.800
19	1968- 1	1042.000	19367.000	63554.000	8925.000	8555.000	18.900	105.800	68.500	117.400	307.600
20	1969- 1	1063.000	19983.000	81357.000	9449.000	10105.000	19.100	109.600	76.600	112.100	324.800
21	1970- 1	1065.000	19715.000	91964.000	8745.000	10020.000	19.000	108.100	81.400	88.700	310.900
22	1971- 1	1348.000	21166.000	92021.000	9595.000	10163.000	24.100	116.100	80.100	118.800	354.000
23	1972- 1	1281.000	22609.000	85326.000	9444.000	10224.000	23.100	124.100	63.900	100.900	335.800
24	1973- 1	1395.000	23841.000	0.0	7517.000	9343.000	25.200	130.100	82.800	80.300	0.0
25	1974- 1	1379.000	24575.000	0.0	9726.000	10456.000	24.900	134.900	79.600	103.900	0.0
26	1975- 1	1763.000	0.0	0.0	9560.000	0.0	31.800	0.0	80.900	102.100	0.0

	1 MTCOAL	2 MTPETR	3 MTGASC	4 MTHYDR	5 MTELEC	6 MTCOAL	7 MTPETR	8 MTGAS*	9 MTHYDR	10 MTGRS

		11 MTELEC	12 MTNETE	13 MHHCOA	14 MHHPET	15 MHHGAS	16 MHHELE	17 MHHCOA	18 MHHPET	19 MHHGAS	20 MHHGR
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	17.500	184.600	519.000	3395.000	28803.000	1686.000	11.200	19.500	30.200	60.500
12	1961- 1	18.000	193.600	478.000	3766.000	29387.000	1796.000	10.300	21.500	30.400	62.200
13	1962- 1	19.000	207.400	480.000	4086.000	29542.000	1937.000	10.400	23.700	31.500	64.600
14	1963- 1	19.600	211.300	479.000	4065.000	30007.000	2066.000	10.300	23.800	30.700	65.200
15	1964- 1	21.300	220.800	478.000	4426.000	32026.000	2208.000	10.300	25.800	34.300	69.300
16	1965- 1	23.500	211.500	432.000	3635.000	34018.000	2359.000	9.300	20.900	37.400	65.300
17	1966- 1	26.600	218.100	377.000	3581.000	33758.000	2450.000	8.100	20.300	36.300	63.200
18	1967- 1	25.700	204.900	427.000	3700.000	32846.000	2621.000	9.200	20.500	36.700	63.600
19	1968- 1	29.200	212.000	351.000	4158.000	31240.000	2820.000	7.600	23.100	38.000	62.900
20	1969- 1	34.500	235.600	296.000	4086.000	35702.000	2991.000	6.400	22.700	40.200	65.900
21	1970- 1	34.200	243.300	228.000	3752.000	40314.000	3115.000	4.900	21.200	40.700	67.700
22	1971- 1	34.700	256.800	299.000	3804.000	41113.000	3288.000	6.500	21.400	41.000	70.200
23	1972- 1	34.900	256.600	210.000	4340.000	40308.000	3502.000	4.500	24.300	43.200	70.200
24	1973- 1	31.900	0.0	211.000	4265.000	0.0	3723.000	4.500	23.900	41.500	0.0
25	1974- 1	35.700	0.0	146.000	4294.000	0.0	3812.000	3.100	24.000	39.800	0.0
26	1975- 1	0.0	0.0	132.000	0.0	0.0	0.0	2.800	0.0	44.300	0.0

	11 MTELEC	12 MTNETE	13 MHHCOA	14 MHHPET	15 MHHGAS	16 MHHELE	17 MHHCOA	18 MHHPET	19 MHHGAS	20 MHHGR

		21 MHHELC	22 MHHNET	23 MIDCOA	24 MIDPET	25 MIDGAS	26 MIDELE	27 MIDCOA	28 MIDPET	29 MIDGAS	30 MIDGR
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	5.800	66.300	244.000	2214.000	26946.000	3350.000	5.300	13.500	20.000	46.700
12	1961- 1	6.100	68.400	300.000	2460.000	26569.000	3388.000	6.500	14.800	21.500	48.800
13	1962- 1	6.600	71.200	333.000	2791.000	30243.000	3521.000	7.200	16.900	22.400	55.400
14	1963- 1	7.000	72.200	300.000	2863.000	33334.000	3567.000	6.500	17.300	24.900	58.800
15	1964- 1	7.500	76.800	418.000	3084.000	34162.000	3962.000	9.000	18.500	27.200	62.900
16	1965- 1	8.100	73.300	346.000	1660.000	35709.000	4439.000	7.500	9.500	28.300	53.600
17	1966- 1	8.400	71.600	293.000	2033.000	36235.000	5254.000	6.300	11.600	29.000	55.300
18	1967- 1	8.900	72.500	213.000	1401.000	32203.000	4819.000	4.600	7.800	26.100	45.600
19	1968- 1	9.600	72.500	216.000	2205.000	31121.000	5659.000	4.700	12.700	27.800	49.400
20	1969- 1	10.200	76.100	168.000	2243.000	43528.000	7051.000	3.600	13.100	33.600	61.600
21	1970- 1	10.600	78.300	185.000	1959.000	46413.000	6825.000	4.000	11.500	38.000	65.400
22	1971- 1	11.200	81.900	267.000	2814.000	49073.000	6787.000	5.800	16.400	36.300	72.800
23	1972- 1	11.900	82.200	318.000	3006.000	42750.000	6632.000	6.900	17.500	37.400	68.300
24	1973- 1	12.600	0.0	295.000	3342.000	0.0	5563.000	6.400	19.400	37.200	0.0
25	1974- 1	12.900	0.0	390.000	3818.000	0.0	6619.000	8.500	22.200	36.600	0.0
26	1975- 1	0.0	0.0	428.000	0.0	0.0	0.0	9.300	0.0	33.200	0.0

		21 MHHELC	22 MHHNET	23 MIDCOA	24 MIDPET	25 MIDGAS	26 MIDELE	27 MIDCOA	28 MIDPET	29 MIDGAS	30 MIDGR

		31 MIDELE	32 MIDNET	33 MTRPET	34 MTRGAS	35 MTRELE	36 MTRPET	37 MTRGAS	38 MTRGR*	39 MTRELE	40 MTRNE
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	11.400	58.100	10852.000	485.000	99.000	58.800	0.500	59.300	0.300	59.600
12	1961- 1	11.600	60.400	11391.000	1313.000	92.000	61.900	1.400	63.300	0.300	63.600
13	1962- 1	12.000	67.400	12058.000	1293.000	100.000	65.100	1.300	66.400	0.300	66.800
14	1963- 1	12.200	71.000	11969.000	1213.000	97.000	64.600	1.300	65.900	0.300	66.200
15	1964- 1	13.500	76.400	11816.000	1290.000	83.000	63.700	1.300	65.000	0.300	65.300
16	1965- 1	15.100	68.900	12561.000	426.000	94.000	67.900	0.400	68.300	0.300	68.700
17	1966- 1	17.900	73.200	12995.000	395.000	97.000	70.400	0.400	70.800	0.300	71.100
18	1967- 1	16.400	62.000	11602.000	776.000	90.000	61.900	0.800	62.700	0.300	63.000
19	1968- 1	19.300	68.800	12711.000	562.000	76.000	68.300	0.600	68.900	0.300	69.100
20	1969- 1	24.100	85.700	13265.000	607.000	63.000	71.400	0.600	72.000	0.200	72.200
21	1970- 1	23.300	88.700	13756.000	708.000	80.000	74.000	0.700	74.700	0.300	75.000
22	1971- 1	23.200	95.900	14397.000	760.000	88.000	77.400	0.800	78.200	0.300	78.500
23	1972- 1	22.600	90.900	14989.000	1050.000	90.000	80.700	1.100	81.800	0.300	82.100
24	1973- 1	18.900	0.0	15711.000	0.0	57.000	84.600	0.0	0.0	0.200	0.0
25	1974- 1	22.500	0.0	16024.000	0.0	25.000	86.300	0.0	0.0	0.100	0.0
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

		31 MIDELE	32 MIDNET	33 MTRPET	34 MTRGAS	35 MTRELE	36 MTRPET	37 MTRGAS	38 MTRGR*	39 MTRELE	40 MTRNE

		41 MELCOA	42 MELPET	43 MELGAS	44 MELHYD	45 MELCOA	46 MELPET	47 MELGAS	48 MELHYD	49 MELGRO	50 MMSPE
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	189.000	2.000	341.000	5801.000	2.600	0.0	0.400	91.100	94.000	94.000
12	1961- 1	267.000	0.0	356.000	6499.000	3.600	0.0	0.400	92.500	96.500	210.000
13	1962- 1	295.000	0.0	3712.000	6410.000	3.900	0.0	4.300	82.000	90.200	343.000
14	1963- 1	287.000	3.000	3303.000	6012.000	3.800	0.0	3.800	78.400	86.000	309.000
15	1964- 1	294.000	53.000	2450.000	6821.000	3.900	0.300	2.900	89.900	96.900	396.000
16	1965- 1	297.000	0.0	1992.000	8389.000	3.900	0.0	2.300	105.500	111.700	97.000
17	1966- 1	325.000	45.000	2977.000	7940.000	4.300	0.300	3.500	95.900	104.000	370.000
18	1967- 1	328.000	6.000	502.000	8704.000	4.300	0.0	0.600	102.800	107.700	1246.000
19	1968- 1	475.000	30.000	631.000	8925.000	6.700	0.100	0.700	117.400	125.000	263.000
20	1969- 1	599.000	119.000	1520.000	9449.000	9.100	0.800	1.800	112.100	123.700	270.000
21	1970- 1	652.000	9.000	2529.000	8745.000	10.100	0.100	2.800	88.700	101.600	239.000
22	1971- 1	782.000	0.0	1075.000	9595.000	11.900	0.0	1.200	118.800	131.900	151.000
23	1972- 1	753.000	25.000	1218.000	9444.000	11.700	0.200	1.400	100.900	114.100	249.000
24	1973- 1	889.000	230.000	2167.000	7517.000	13.800	1.800	2.500	80.300	0.0	292.000
25	1974- 1	843.000	52.000	1038.000	9726.000	13.100	0.400	1.200	103.900	0.0	396.000
26	1975- 1	1203.000	0.0	1073.000	8560.000	18.700	0.0	1.200	102.100	0.0	0.0

	41 MELCOA	42 MELPET	43 MELGAS	44 MELHYD	45 MELCOA	46 MELPET	47 MELGAS	48 MELHYD	49 MELGRO	50 MMSPE

		51 MMSPET	52 MMSGRO	53 MMSNET	54 MPETGA	55 MPETJE	56 MPETKE	57 MPETDI	58 MPETRE	59 MPETLP	60 MPETA
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	0.600	0.600	0.600	7513.000	18.000	476.000	4877.000	2022.000	737.000	914.000
12	1961- 1	1.300	1.300	1.300	7930.000	31.000	359.000	5248.000	2533.000	857.000	869.000
13	1962- 1	2.000	2.000	2.000	8753.000	40.000	265.000	5522.000	3049.000	819.000	830.000
14	1963- 1	1.900	1.900	1.900	8848.000	65.000	348.000	5400.000	2836.000	765.000	947.000
15	1964- 1	2.300	2.300	2.300	8631.000	79.000	651.000	5684.000	2356.000	931.000	1413.000
16	1965- 1	0.600	0.600	0.600	9349.000	134.000	248.000	5041.000	1195.000	926.000	1060.000
17	1966- 1	2.200	2.200	2.200	9350.000	182.000	117.000	5802.000	1371.000	1165.000	1037.000
18	1967- 1	7.300	7.300	7.300	9458.000	279.000	860.000	3459.000	1189.000	1585.000	1125.000
19	1968- 1	1.600	1.600	1.600	9560.000	366.000	816.000	4119.000	1495.000	1685.000	1326.000
20	1969- 1	1.600	1.600	1.600	9664.000	511.000	656.000	4669.000	1524.000	1690.000	1269.000
21	1970- 1	1.300	1.300	1.300	10125.000	395.000	376.000	4623.000	1249.000	1327.000	1420.000
22	1971- 1	0.900	0.900	0.900	10598.000	469.000	362.000	5709.000	1236.000	1403.000	1369.000
23	1972- 1	1.400	1.400	1.400	10899.000	469.000	383.000	6121.000	1485.000	1704.000	1546.000
24	1973- 1	1.600	0.0	0.0	11305.000	500.000	405.000	6424.000	1705.000	1502.000	1500.000
25	1974- 1	2.200	0.0	0.0	11000.000	500.000	174.000	7646.000	2290.000	1465.000	1500.000
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

		51 MMSPET	52 MMSGRO	53 MMSNET	54 MPETGA	55 MPETJE	56 MPETKE	57 MPETDI	58 MPETRE	59 MPETLP	60 MPETA

		61 MPETTO	62 MPETGA	63 MPETJE	64 MPETKE	65 MPETDI	66 MPETRE	67 MPETLP	68 MPETAS	69 MPETTO	70 MHHKE
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	16597.000	39.400	0.100	2.700	28.400	12.700	3.000	6.100	92.400	465.000
12	1961- 1	17827.000	41.600	0.200	2.000	30.600	15.900	3.400	5.800	99.500	300.000
13	1962- 1	19278.000	45.900	0.200	1.500	32.200	19.200	3.200	5.500	107.700	262.000
14	1963- 1	19209.000	46.400	0.400	2.000	31.500	17.900	3.100	6.300	107.600	345.000
15	1964- 1	19775.000	45.300	0.400	3.700	33.100	14.800	3.700	9.600	110.600	629.000
16	1965- 1	17953.000	49.100	0.800	1.400	29.300	7.600	3.700	7.000	98.900	227.000
17	1966- 1	19024.000	49.100	1.000	0.600	33.900	8.600	4.700	6.900	104.800	79.000
18	1967- 1	17955.000	49.600	1.600	4.900	20.100	7.500	6.300	7.500	97.500	157.000
19	1968- 1	19367.000	50.200	2.100	4.600	24.000	9.300	6.800	8.800	105.800	111.000
20	1969- 1	19983.000	50.700	2.900	3.800	27.300	9.700	6.800	8.400	109.600	133.000
21	1970- 1	19715.000	53.100	2.200	2.100	28.100	7.900	5.300	9.400	108.100	94.000
22	1971- 1	21166.000	55.600	2.700	2.000	33.300	7.700	5.600	9.200	116.100	76.000
23	1972- 1	22609.000	57.200	2.700	2.100	35.700	9.300	6.800	10.300	124.100	77.000
24	1973- 1	23841.000	59.300	2.800	2.300	40.300	10.700	6.000	10.000	131.400	84.000
25	1974- 1	24575.000	57.700	2.800	1.000	44.500	14.400	5.900	10.000	136.300	64.000
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

		61 MPETTO	62 MPETGA	63 MPETJE	64 MPETKE	65 MPETDI	66 MPETRE	67 MPETLP	68 MPETAS	69 MPETTO	70 MHHKE

		71 MHHDIS	72 MHHRES	73 MHHLPG	74 MHHASP	75 MHHTOT	76 MHHKER	77 MHHDIS	78 MHHRES	79 MHHLPG	80 MHHAS
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	1066.000	354.000	596.000	914.000	3395.000	2.600	6.200	2.200	2.400	6.100
12	1961- 1	1407.000	465.000	725.000	869.000	3766.000	1.700	8.200	2.900	2.900	5.800
13	1962- 1	1324.000	1011.000	659.000	830.000	4086.000	1.500	7.700	3.400	2.600	5.300
14	1963- 1	1307.000	879.000	587.000	947.000	4065.000	2.000	7.600	5.500	2.400	6.300
15	1964- 1	1080.000	503.000	771.000	1443.000	4426.000	3.000	6.300	3.200	3.100	9.600
16	1965- 1	1096.000	504.000	748.000	1060.000	3635.000	1.300	6.400	3.200	3.000	7.000
17	1966- 1	1092.000	482.000	891.000	1037.000	3581.000	0.400	6.400	3.000	3.600	6.900
18	1967- 1	829.000	419.000	1170.000	1125.000	3700.000	0.900	4.800	2.600	4.700	7.500
19	1968- 1	1045.000	419.000	1257.000	1326.000	4158.000	0.600	6.100	2.600	5.000	8.800
20	1969- 1	1197.000	226.000	1261.000	1269.000	4086.000	0.800	7.000	1.400	5.100	8.400
21	1970- 1	1011.000	183.000	1044.000	1420.000	3752.000	0.500	5.900	1.200	4.200	9.400
22	1971- 1	1095.000	177.000	1065.000	1389.000	3804.000	0.400	6.400	1.100	4.300	9.200
23	1972- 1	1219.000	209.000	1287.000	1548.000	4340.000	0.400	7.100	1.300	5.200	10.300
24	1973- 1	1337.000	208.000	1136.000	1500.000	4265.000	0.0	0.0	0.0	0.0	0.0
25	1974- 1	1246.000	376.000	1108.000	1500.000	4294.000	0.0	0.0	0.0	0.0	0.0
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	71 MHHDIS	72 MHHRES	73 MHHLPG	74 MHHASP	75 MHHTOT	76 MHHKER	77 MHHDIS	78 MHHRES	79 MHHLPG	80 MHHAS

		81 MMHTOT	82 MIDKER	83 MIDDIS	84 MIDRES	85 MIDLPG	86 MIDTOT	87 MIDKER	88 MIDDIS	89 MIDRES	90 MIDLP
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	19.500	11.000	931.000	1256.000	16.000	2214.000	0.100	5.400	7.900	0.100
12	1961- 1	21.500	59.000	985.000	1405.000	11.000	2460.000	0.300	5.700	8.800	0.0
13	1962- 1	23.700	3.000	1262.000	1499.000	27.000	2791.000	0.0	7.400	9.400	0.100
14	1963- 1	23.800	3.000	1350.000	1459.000	51.000	2863.000	0.0	7.900	9.200	0.200
15	1964- 1	25.800	22.000	1628.000	1376.000	58.000	3084.000	0.100	9.500	8.700	0.200
16	1965- 1	20.900	21.000	1185.000	322.000	132.000	1660.000	0.100	6.900	2.000	0.500
17	1966- 1	20.300	38.000	1388.000	398.000	209.000	2033.000	0.200	8.100	2.500	0.600
18	1967- 1	20.500	703.000	101.000	344.000	253.000	1401.000	4.000	0.600	2.200	1.000
19	1968- 1	23.100	705.000	477.000	783.000	240.000	2205.000	4.000	2.800	4.900	1.000
20	1969- 1	22.700	523.000	576.000	915.000	229.000	2243.000	3.000	3.400	5.800	0.900
21	1970- 1	21.200	282.000	597.000	901.000	179.000	1959.000	1.600	3.500	5.700	0.700
22	1971- 1	21.400	284.000	1371.000	957.000	202.000	2814.000	1.600	8.000	6.000	0.800
23	1972- 1	24.300	306.000	1295.000	1194.000	211.000	3006.000	1.700	7.500	7.500	0.800
24	1973- 1	24.100	321.000	1475.000	1355.000	191.000	3342.000	0.0	0.0	0.0	0.0
25	1974- 1	24.400	110.000	1750.000	1772.000	186.000	3818.000	0.0	0.0	0.0	0.0
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	81 MMHTDT	82 MIDKER	83 MIDDIS	84 MIDRES	85 MIDLPG	86 MIDTOT	87 MIDKER	88 MIDDIS	89 MIDRES	90 MIDLP

		91 MIDTOT	92 MTRGAS	93 MTRJET	94 MTRDIS	95 MTRRES	96 MTRLPG	97 MTRTOT	98 MTRGAS	99 MTRJET	100 MTRDI
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	13.500	7513.000	18.000	2827.000	369.000	125.000	10852.000	39.400	0.100	16.500
12	1961- 1	14.800	7930.000	31.000	2706.000	606.000	118.000	11391.000	41.600	0.200	15.800
13	1962- 1	16.900	8753.000	40.000	2662.000	471.000	132.000	12056.000	45.900	0.200	15.500
14	1963- 1	17.300	8848.000	65.000	2523.000	407.000	126.000	11969.000	46.400	0.400	14.700
15	1964- 1	18.500	8631.000	79.000	2696.000	308.000	102.000	11816.000	45.300	0.400	15.700
16	1965- 1	9.500	9349.000	134.000	2719.000	313.000	46.000	12561.000	49.100	0.800	[illegible]
17	1966- 1	11.600	9350.000	182.000	3017.000	381.000	65.000	12995.000	49.100	1.000	[illegible]
18	1967- 1	7.800	9458.000	279.000	1373.000	330.000	162.000	11602.000	49.600	1.600	[illegible]
19	1968- 1	12.700	9560.000	366.000	2356.000	241.000	188.000	12711.000	50.200	2.100	13.700
20	1969- 1	13.100	9664.000	511.000	2658.000	233.000	199.000	13265.000	50.700	2.900	15.500
21	1970- 1	11.500	10125.000	395.000	3018.000	119.000	99.000	13756.000	53.100	2.200	17.600
22	1971- 1	16.400	10598.000	469.000	3113.000	85.000	132.000	14397.000	55.600	2.700	18.100
23	1972- 1	17.500	10299.000	469.000	3356.000	64.000	199.000	14989.000	57.200	2.700	19.600
24	1973- 1	0.0	11305.000	500.000	3693.000	44.000	169.000	15711.000	0.0	0.0	0.0
25	1974- 1	0.0	11000.000	500.000	4235.000	124.000	165.000	16024.000	0.0	0.0	0.0
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	91 MIDTOT	92 MTRGAS	93 MTRJET	94 MTRDIS	95 MTRRES	96 MTRLPG	97 MTRTOT	98 MTRGAS	99 MTRJET	100 MTRDI

	101 MTRRES	102 MTRLPG	103 MTRTOT	104 MELDIS	105 MELRES	106 MELTOT	107 MELDIS	108 MELRES	109 MELTOT	110 MMSDI
1 1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 1960- 1	2.300	0.500	58.800	0.0	2.000	2.000	0.0	0.0	0.0	53.000
12 1961- 1	3.800	0.500	61.900	0.0	0.0	0.0	0.0	0.0	0.0	150.000
13 1962- 1	3.000	0.500	65.100	0.0	0.0	0.0	0.0	0.0	0.0	274.000
14 1963- 1	2.600	0.500	64.600	0.0	3.000	3.000	0.0	0.0	0.0	220.000
15 1964- 1	1.900	0.400	63.700	0.0	53.000	53.000	0.0	0.300	0.300	280.000
16 1965- 1	2.000	0.200	67.900	0.0	0.0	0.0	0.0	0.0	0.0	41.000
17 1966- 1	2.400	0.300	70.400	0.0	45.000	45.000	0.0	0.300	0.300	305.000
18 1967- 1	2.100	0.600	61.900	0.0	6.000	6.000	0.0	0.0	0.0	1156.000
19 1968- 1	1.500	0.800	70.400	7.000	23.000	30.000	0.0	0.100	0.100	234.000
20 1969- 1	1.500	0.800	61.900	14.000	105.000	119.000	0.100	0.700	0.800	224.000
21 1970- 1	0.700	0.400	68.300	0.0	9.000	9.000	0.0	0.100	0.100	197.000
22 1971- 1	0.500	0.500	71.400	0.0	0.0	0.0	0.0	0.0	0.0	130.000
23 1972- 1	0.400	0.800	74.000	9.000	16.000	25.000	0.100	0.100	0.200	240.000
24 1973- 1	0.0	0.0	77.400	159.000	71.000	230.000	0.0	0.0	1.400	260.000
25 1974- 1	0.0	0.0	80.700	49.000	3.000	52.000	0.0	0.0	0.300	366.000
26 1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

	101 MTRRES	102 MTRLPG	103 MTRTOT	104 MELDIS	105 MELRES	106 MELTOT	107 MELDIS	108 MELRES	109 MELTOT	110 MMSDI

		111 MMSRES	112 MMSLPG	113 MMSTOT	114 MMSDIS	115 MMSRES	116 MMSLPG	117 MMSTOT	118 MGASST	119 MHHGAS	120 MIDGA
1	1950- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	1951- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	1953- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1954- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	1955- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	1956- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	1957- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	1958- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	1959- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1960- 1	41.000	0.0	94.000	0.300	0.300	0.0	0.600	50509.000	29200.000	19301.000
12	1961- 1	57.000	3.000	210.000	0.900	0.400	0.0	1.300	52126.000	29368.000	20810.000
13	1962- 1	68.000	1.000	343.000	1.600	0.400	0.0	2.000	54304.000	30551.000	21687.000
14	1963- 1	88.000	1.000	309.000	1.300	0.600	0.0	1.900	55928.000	29702.000	24089.000
15	1964- 1	116.000	0.0	396.000	1.600	0.700	0.0	2.300	61711.000	33115.000	26298.000
16	1965- 1	56.000	0.0	97.000	0.200	0.400	0.0	0.600	65829.000	36137.000	27311.000
17	1966- 1	65.000	0.0	370.000	1.800	0.400	0.0	2.200	65445.000	35086.000	28002.000
18	1967- 1	90.000	0.0	1246.000	6.700	0.600	0.0	7.300	63142.000	35504.000	25187.000
19	1968- 1	29.000	0.0	263.000	1.400	0.200	0.0	1.600	66132.000	36752.000	26818.000
20	1969- 1	45.000	1.000	270.000	1.300	0.300	0.0	1.600	73933.000	38871.000	32447.000
21	1970- 1	37.000	5.000	239.000	1.100	0.200	0.0	1.300	78596.000	39332.000	36669.000
22	1971- 1	17.000	4.000	151.000	0.800	0.100	0.0	0.900	77315.000	39621.000	35023.000
23	1972- 1	2.000	7.000	249.000	1.400	0.0	0.0	1.400	81046.000	41784.000	36096.000
24	1973- 1	27.000	5.000	292.000	0.0	0.0	0.0	1.700	79987.000	40132.000	35890.000
25	1974- 1	15.000	5.000	396.000	0.0	0.0	0.0	2.200	76844.000	38501.000	35359.000
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78135.000	42873.000	32082.000

		111 MMSRES	112 MMSLPG	113 MMSTOT	114 MMSDIS	115 MMSRES	116 MMSLPG	117 MMSTOT	118 MGASST	119 MHHGAS	120 MIDGA

		121 USCRUP	122 USCRUP	123 USCRUI	124 MCRUPR	125 UNETIM	126 MCRUPR	127 MCRUPR	128 MCRUPR	129 REFMT	130 REFWY
1	1950- 1	0.0	0.0	0.0	6109.000	0.0	2.520	7841.000	2.470	0.0	0.0
2	1951- 1	2247.100	2.530	152.500	8958.000	3.700	2.470	8814.000	2.350	0.0	0.0
3	1952- 1	2289.800	2.530	182.900	9606.000	7.400	2.250	9527.000	2.260	0.0	0.0
4	1953- 1	2357.100	2.680	216.500	11920.000	14.400	2.180	11793.000	2.230	7497.000	12112.000
5	1954- 1	2315.000	2.780	225.900	14195.000	28.300	2.200	14023.000	2.220	9034.000	10865.000
6	1955- 1	2484.500	2.770	273.900	15654.000	48.600	2.260	16548.000	2.180	9858.000	11210.000
7	1956- 1	2617.300	2.790	313.200	21760.000	55.000	2.580	21262.000	2.470	9053.000	13720.000
8	1957- 1	2616.900	3.090	323.000	27122.000	44.400	2.700	26658.000	2.430	9222.000	13665.000
9	1958- 1	2449.000	3.010	343.700	27957.000	176.300	2.650	27816.000	2.620	9165.000	14089.000
10	1959- 1	2574.600	2.900	350.000	29857.000	222.700	2.560	29985.000	2.500	10913.000	15141.000
11	1960- 1	2574.900	2.830	368.500	30240.000	223.300	2.410	29937.000	2.450	10531.000	14383.000
12	1961- 1	2621.800	2.890	378.300	30906.000	257.600	2.420	30499.000	2.420	9797.000	14036.000
13	1962- 1	2676.200	2.900	409.200	31648.000	289.200	2.420	31270.000	2.440	11175.000	16708.000
14	1963- 1	2752.700	2.890	411.000	30870.000	287.800	2.440	30364.000	2.440	11798.000	14745.000
15	1964- 1	2786.800	2.880	437.300	30647.000	315.600	2.430	30241.000	2.450	12292.000	15714.000
16	1965- 1	2848.500	2.860	450.900	32778.000	382.000	2.430	32089.000	2.440	11971.000	16416.000
17	1966- 1	3027.800	2.880	445.600	35380.000	421.100	2.440	34734.000	2.450	10626.000	18120.000
18	1967- 1	3215.700	2.920	385.100	34959.000	428.800	2.500	34316.000	2.500	10632.000	21393.000
19	1968- 1	3329.000	2.940	470.500	48460.000	484.300	2.570	47152.000	2.560	9690.000	20915.000
20	1969- 1	3371.800	3.090	512.700	43954.000	558.000	2.690	44446.000	2.760	9465.000	22130.000
21	1970- 1	3517.500	3.180	478.300	37879.000	675.300	2.780	38058.000	2.830	9080.000	19342.000
22	1971- 1	3453.900	3.390	612.900	34599.000	736.000	3.010	34625.000	3.050	9262.000	19732.000
23	1972- 1	3455.400	3.390	811.100	33904.000	765.800	3.070	34572.000	2.990	9049.000	19241.000
24	1973- 1	3360.900	3.890	1183.300	34620.000	926.300	3.330	34584.000	3.850	9695.000	18235.000
25	1974- 1	3199.000	6.740	1267.700	34554.000	887.400	6.650	34629.000	6.820	9321.000	16949.000
26	1975- 1	0.0	0.0	0.0	32844.000	0.0	0.0	0.0	0.0	8929.000	19796.000

		121 USCRUP	122 USCRUP	123 USCRUI	124 MCRUPR	125 UNETIM	126 MCRUPR	127 MCRUPR	128 MCRUPR	129 REFMT	130 REFWY

		131 REFCAN	132 REFTOT	133 MPROGA	134 USCOAL	135 USCOAL	136 MBITPR	137 MLIGPR	138 MCOALP	139 MBIT$	140 MLIG$
1	1950- 1	0.0	0.0	6756.000	516313.000	4.840	2468.000	52.000	2520.000	2.300	3.370
2	1951- 1	0.0	0.0	7732.000	533665.000	4.920	2310.000	35.000	2345.000	2.610	3.510
3	1952- 1	0.0	0.0	8158.000	466841.000	4.900	2039.000	31.000	2070.000	2.800	3.700
4	1953- 1	0.0	19609.000	8926.000	457290.000	4.920	1848.000	25.000	1873.000	2.640	3.770
5	1954- 1	0.0	19909.000	8637.000	391706.000	4.510	1491.000	0.0	0.0	2.790	0.0
6	1955- 1	0.0	21081.000	8967.000	464633.000	4.500	1217.000	30.000	1247.000	3.010	3.820
7	1956- 1	88.000	22861.000	9621.000	500874.000	4.820	820.000	26.000	846.000	4.110	3.700
8	1957- 1	92.000	22979.000	9856.000	492704.000	5.080	387.000	26.000	413.000	5.330	3.800
9	1958- 1	12.000	23265.000	9518.000	410446.000	4.860	211.000	94.000	305.000	5.940	2.340
10	1959- 1	4.000	26059.000	10452.000	412028.000	4.770	152.000	193.000	345.000	7.060	2.080
11	1960- 1	21.000	24935.000	10539.000	415512.000	4.690	113.000	200.000	313.000	6.870	2.060
12	1961- 1	33.000	23869.000	10328.000	402977.000	4.580	97.000	274.000	371.000	6.760	2.010
13	1962- 1	266.000	28149.000	11943.000	422149.000	4.480	78.000	304.000	382.000	6.900	1.990
14	1963- 1	1553.000	28097.000	12733.000	458928.000	4.390	53.000	290.000	343.000	7.510	1.950
15	1964- 1	4002.000	32007.000	15304.000	486998.000	4.450	46.000	300.000	346.000	7.400	1.950
16	1965- 1	4654.000	33041.000	15603.000	512088.000	4.440	63.000	301.000	364.000	7.240	1.960
17	1966- 1	4684.000	33429.000	17014.000	533881.000	4.540	91.000	328.000	419.000	7.100	1.960
18	1967- 1	5052.000	37078.000	18757.000	552626.000	4.620	65.000	300.000	365.000	0.0	0.0
19	1968- 1	10347.000	40951.000	21210.000	545245.000	4.670	189.000	330.000	519.000	3.120	1.890
20	1969- 1	8843.000	40438.000	21397.000	560505.000	4.990	722.000	308.000	1030.000	2.180	2.030
21	1970- 1	13906.000	42330.000	22233.000	602932.000	6.260	3124.000	323.000	3447.000	1.830	2.130
22	1971- 1	16003.000	44997.000	23922.000	552192.000	7.070	6737.000	327.000	7064.000	1.790	2.270
23	1972- 1	20175.000	48465.000	27053.000	595386.000	7.660	7899.000	322.000	8221.000	2.010	2.450
24	1973- 1	23037.000	50967.000	27313.000	591738.000	8.530	10411.000	314.000	10725.000	2.830	2.600
25	1974- 1	21783.000	48053.000	0.0	601000.000	0.0	0.0	0.0	14106.000	0.0	0.0
26	1975- 1	19373.000	48099.000	0.0	0.0	0.0	0.0	0.0	21000.000	0.0	0.0

	131 REFCAN	132 REFTOT	133 MPROGA	134 USCOAL	135 USCOAL	136 MBITPR	137 MLIGPR	138 MCOALP	139 MBIT$	140 MLIG$

		141 MCOAL$	142 MCOALP	143 MCOALP	144 MELEGE	145 MELPR	146 MELPRH	147 MELPRC	148 MELPRI	149 MELPRS	150 MELPR
1	1950- 1	2.330	2493821.000	2.340	3136.000	1.060	2.700	2.420	0.500	2.410	0.840
2	1951- 1	2.630	2281235.000	2.540	3304.000	1.080	2.660	2.370	0.510	2.320	0.730
3	1952- 1	2.810	2067419.000	2.760	3778.000	1.080	2.600	2.390	0.500	2.280	0.800
4	1953- 1	2.660	1868063.000	2.660	3719.000	1.030	2.520	2.420	0.470	2.350	0.520
5	1954- 1	0.0	1474806.000	2.620	4274.000	1.140	2.440	2.370	0.480	2.180	0.560
6	1955- 1	3.030	1196075.000	2.830	4696.000	0.990	2.340	2.320	0.430	2.250	0.600
7	1956- 1	4.100	1334422.000	2.830	5495.000	0.860	2.340	2.170	0.380	2.320	0.650
8	1957- 1	5.230	394703.000	4.350	5215.000	0.930	2.280	2.080	0.400	2.300	0.660
9	1958- 1	4.840	338836.000	3.550	4551.000	0.990	2.340	2.150	0.410	2.390	0.670
10	1959- 1	4.280	337866.000	3.590	4934.000	1.100	2.370	2.220	0.430	2.560	0.700
11	1960- 1	3.790	301273.000	3.560	5992.000	1.050	2.330	2.250	0.430	2.450	0.790
12	1961- 1	3.260	358848.000	3.040	6780.000	1.060	2.320	2.180	0.450	2.700	0.740
13	1962- 1	2.980	365850.000	2.450	7051.000	1.070	2.290	2.130	0.460	2.500	0.610
14	1963- 1	2.820	336548.000	2.570	6594.000	1.070	2.250	2.060	0.450	2.760	0.760
15	1964- 1	2.680	344636.000	2.580	7360.000	1.030	2.200	2.020	0.450	2.560	0.710
16	1965- 1	2.880	377248.000	2.830	8882.000	0.980	2.120	1.930	0.440	2.750	0.700
17	1966- 1	3.080	415410.000	2.910	8611.000	0.920	2.090	1.920	0.430	2.560	0.660
18	1967- 1	0.0	364509.000	2.420	9117.000	0.950	2.040	1.890	0.420	2.790	0.630
19	1968- 1	2.330	555271.000	2.150	9495.000	0.900	1.990	1.830	0.400	2.770	0.610
20	1969- 1	2.130	1024885.000	2.070	10442.000	0.880	2.100	1.930	0.410	2.750	0.570
21	1970- 1	1.860	3517158.000	1.820	10026.000	0.940	2.130	1.940	0.420	2.860	0.600
22	1971- 1	1.820	7097126.000	1.790	10653.000	0.950	2.120	1.940	0.430	3.020	0.620
23	1972- 1	2.020	8264405.000	2.030	10689.000	1.000	2.160	1.980	0.440	3.210	0.530
24	1973- 1	2.820	10729019.000	2.830	9132.000	1.160	2.210	2.040	0.530	3.270	0.600
25	1974- 1	3.900	14124055.000	3.840	11056.000	1.100	2.230	2.050	0.500	3.230	0.580
26	1975- 1	5.000	22162096.000	4.970	0.0	0.0	0.0	0.0	0.0	0.0	0.0

141 MCOAL$ 142 MCOALP 143 MCOALP 144 MELEGE 145 MELPR 146 MELPRH 147 MELPRC 148 MELPRI 149 MELPRS 150 MELPR

		151 MELPRR	152 MELPRI	153 UGASPR	154 UGASPR	155 UGASPR	156 UGASPR	157 UGASPR	158 MGASPR	159 MGASPR	160 MGASP
1	1950- 1	0.570	0.540	6.500	26.600	69.000	47.600	17.600	38972.000	5.300	28.700
2	1951- 1	0.540	0.560	7.300	29.800	76.000	52.900	19.200	36225.000	5.500	31.300
3	1952- 1	0.540	0.820	7.800	33.200	83.100	57.000	20.700	28557.000	6.100	31.800
4	1953- 1	0.540	0.880	9.200	35.500	86.500	61.000	22.700	27736.000	5.900	32.900
5	1954- 1	0.540	0.730	10.100	38.100	89.300	64.700	23.600	30087.000	6.800	37.500
6	1955- 1	0.540	0.920	10.400	40.000	88.700	62.700	25.700	28100.000	6.700	36.700
7	1956- 1	0.550	1.100	10.800	41.500	91.300	64.900	25.300	25706.000	6.800	36.800
8	1957- 1	0.540	1.380	11.300	43.100	93.000	68.900	26.400	28481.000	7.200	36.900
9	1958- 1	0.540	0.860	11.900	46.200	98.200	69.500	27.800	27836.000	6.800	38.400
10	1959- 1	0.550	0.590	12.900	47.700	101.100	72.100	29.400	30575.000	7.500	41.600
11	1960- 1	0.560	1.270	14.000	50.100	103.400	77.500	31.700	33235.000	7.100	41.600
12	1961- 1	0.550	1.700	15.100	51.000	107.000	77.800	31.200	33716.000	7.400	40.300
13	1962- 1	0.550	1.430	15.300	51.400	104.300	77.900	32.200	29791.000	7.400	41.900
14	1963- 1	0.570	1.670	15.800	51.200	104.500	78.600	32.200	29662.000	7.500	41.300
15	1964- 1	0.530	2.000	15.400	51.900	105.900	77.500	32.200	25050.000	7.800	45.700
16	1965- 1	0.590	1.670	15.600	52.200	104.800	77.300	38.400	26105.000	8.200	46.800
17	1966- 1	0.570	1.670	15.700	52.300	104.300	76.300	32.000	30685.000	8.300	45.800
18	1967- 1	0.490	1.080	16.000	51.900	104.300	77.900	31.700	25866.000	8.400	49.900
19	1968- 1	0.580	1.110	16.400	50.300	104.100	77.700	33.900	19313.000	9.100	50.900
20	1969- 1	0.530	1.050	16.700	51.500	104.700	78.200	34.800	41229.000	10.200	52.200
21	1970- 1	0.550	1.000	17.100	53.800	108.900	81.600	37.000	42705.000	10.300	52.900
22	1971- 1	0.500	0.950	18.200	57.500	114.900	86.700	40.900	32720.000	12.100	56.300
23	1972- 1	0.490	1.190	18.600	62.100	121.300	91.900	45.000	33474.000	12.300	58.700
24	1973- 1	0.580	1.670	21.600	66.300	128.700	97.600	50.000	56175.000	23.600	66.100
25	1974- 1	0.530	1.410	30.400	81.900	142.900	112.200	67.300	54873.000	25.200	75.800
26	1975- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

		151 MELPRR	152 MELPRI	153 UGASPR	154 UGASPR	155 UGASPR	156 UGASPR	157 UGASPR	158 MGASPR	159 MGASPR	160 MGASP

		161 MGASPR	162 MGASPR	163 MGASPR	164 MGASPR	165 MGASPR	166 MGASPR	167 MGASPR	168 MPCRES	169 MPCIND	170 MPCOT
1	1950- 1	30.100	47.300	32.800	14.200	39708.000	39010.000	5.000	0.0	0.0	0.0
2	1951- 1	32.000	51.000	35.100	16.000	39036.000	36123.000	5.300	0.0	0.0	0.0
3	1952- 1	32.400	50.700	35.200	19.200	30409.000	27939.000	5.700	0.0	0.0	0.0
4	1953- 1	33.700	53.100	36.800	19.400	31779.000	28592.000	6.300	47.210	20.460	17.980
5	1954- 1	38.800	58.900	41.500	20.100	31150.000	29765.000	6.000	45.390	20.590	18.170
6	1955- 1	38.000	58.300	41.100	20.200	30468.000	30227.000	5.200	45.040	20.710	18.240
7	1956- 1	38.200	58.500	41.200	20.600	29356.000	28350.000	6.100	45.290	21.250	18.230
8	1957- 1	38.000	58.300	41.300	20.800	32979.000	31413.000	6.000	56.340	25.050	20.510
9	1958- 1	40.100	64.700	44.300	21.800	31327.000	27689.000	6.500	57.130	27.340	24.620
10	1959- 1	45.600	64.700	45.700	26.700	31585.000	30551.000	6.000	56.660	28.120	25.170
11	1960- 1	45.400	66.000	46.400	27.400	35381.000	30411.000	6.800	56.870	27.860	25.330
12	1961- 1	43.800	65.500	45.900	25.700	34884.000	32407.000	6.400	57.070	28.100	25.260
13	1962- 1	46.400	75.200	50.600	25.100	28973.000	29417.000	6.100	63.520	29.810	26.980
14	1963- 1	46.200	74.600	50.700	26.800	27113.000	25504.000	6.600	67.400	32.210	32.790
15	1964- 1	49.500	76.300	53.300	30.300	25234.000	23592.000	6.600	66.910	32.150	32.690
16	1965- 1	50.600	78.100	54.100	31.100	27873.000	26285.000	6.500	66.830	31.870	32.680
17	1966- 1	49.500	77.900	54.300	30.400	32414.000	29041.000	8.100	67.330	32.180	32.800
18	1967- 1	54.600	79.600	57.100	34.100	31619.000	29276.000	7.900	67.210	34.590	32.790
19	1968- 1	55.400	82.200	60.300	32.600	31917.000	28831.000	8.800	67.070	32.900	32.380
20	1969- 1	56.200	88.200	64.300	33.800	41229.000	37804.000	7.200	72.430	33.520	35.060
21	1970- 1	57.200	90.700	65.900	33.900	37445.000	35225.000	8.100	75.630	33.880	38.900
22	1971- 1	60.300	93.400	68.500	35.700	38137.000	28775.000	8.200	76.930	34.530	38.970
23	1972- 1	63.000	96.500	69.100	38.100	35606.000	32171.000	10.000	80.310	35.540	40.480
24	1973- 1	69.800	108.600	80.400	42.500	58896.000	56363.000	15.900	92.610	43.960	48.170
25	1974- 1	80.400	111.900	92.600	58.000	51401.000	41753.000	25.200	100.870	62.610	60.490
26	1975- 1	0.0	0.0	0.0	0.0	43673.000	0.0	0.0	124.890	105.330	88.910

	161 MGASPR	162 MGASPR	163 MGASPR	164 MGASPR	165 MGASPR	166 MGASPR	167 MGASPR	168 MPCRES	169 MPCIND	170 MPCOT

		171 MDURES	172 MDUIND	173 MDUOTH	174 MPCRES	175 MPCIND	176 MPCOTH	177 MPCTOT	178 MDURES	179 MDUIND	180 MDUOT
1	1950- 1	0.0	0.0	0.0	8648.000	8942.000	705.000	18295.000	4228.000	240.000	469.000
2	1951- 1	0.0	0.0	0.0	8848.000	13055.000	720.000	22623.000	5514.000	1180.000	499.000
3	1952- 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7340.000	1845.000	468.000
4	1953- 1	46.680	20.780	0.0	8848.000	13700.000	719.000	23267.000	7223.000	1863.000	460.000
5	1954- 1	50.620	26.310	0.0	9406.000	12323.000	746.000	22474.000	7912.000	1649.000	495.000
6	1955- 1	50.820	25.610	0.0	12204.000	15621.000	826.000	28652.000	7594.000	1996.000	533.000
7	1956- 1	51.300	26.350	0.0	12076.000	15720.000	788.000	28584.000	7708.000	2212.000	509.000
8	1957- 1	51.490	27.060	0.0	13661.000	15677.000	834.000	30171.000	7797.000	2056.000	492.000
9	1958- 1	52.090	27.120	0.0	13445.000	15334.000	836.000	29615.000	7429.000	3233.000	551.000
10	1959- 1	51.470	26.490	0.0	15576.000	12802.000	1025.000	29402.000	8678.000	2934.000	507.000
11	1960- 1	51.870	26.870	0.0	15604.000	15641.000	1150.000	32396.000	8516.000	3148.000	342.000
12	1961- 1	51.950	24.570	0.0	15567.000	16824.000	1165.000	33556.000	8689.000	3606.000	177.000
13	1962- 1	51.560	29.160	0.0	16233.000	18265.000	1211.000	35709.000	9148.000	3051.000	103.000
14	1963- 1	51.720	28.310	0.0	15901.000	19831.000	1265.000	36998.000	8826.000	3862.000	79.000
15	1964- 1	51.500	28.370	0.0	18031.000	21131.000	1396.000	40558.000	9620.000	4687.000	55.000
16	1965- 1	50.730	27.080	0.0	19255.000	22382.000	1452.000	43106.000	10955.000	4430.000	61.000
17	1966- 1	53.630	26.390	0.0	18954.000	23256.000	1456.000	43666.000	10414.000	4256.000	55.000
18	1967- 1	59.790	30.480	0.0	19255.000	20977.000	1528.000	41760.000	10584.000	3813.000	67.000
19	1968- 1	65.160	30.090	32.170	20327.000	21871.000	1645.000	43843.000	10847.000	4523.000	65.000
20	1969- 1	67.930	30.010	32.250	21177.000	25758.000	1669.000	48604.000	11534.000	6277.000	55.000
21	1970- 1	68.620	29.750	32.980	21897.000	27709.000	1591.000	51197.000	11499.000	8582.000	102.000
22	1971- 1	73.540	30.100	33.180	22060.000	26339.000	1637.000	50036.000	11612.000	8317.000	139.000
23	1972- 1	74.760	31.130	33.650	23142.000	27525.000	1682.000	52349.000	12352.000	8218.000	600.000
24	1973- 1	77.710	33.730	35.530	22896.000	26791.000	1686.000	51373.000	11525.000	8685.000	1415.000
25	1974- 1	83.360	40.160	39.370	21831.000	26492.000	1589.000	49912.000	11230.000	8455.000	588.000
26	1975- 1	83.090	52.250	56.960	0.0	0.0	0.0	0.0	12785.000	7244.000	586.000

	171 MDURES	172 MDUIND	173 MDUOTH	174 MPCRES	175 MPCIND	176 MPCOTH	177 MPCTOT	178 MDURES	179 MDUIND	180 MDUOT

		181 MDUTOT	182 GFGRES	183 GFGIND	184 GFGOTH	185 GFGTOT	186 MEMPMA	187 MNONAG	188 TEMP	189 TIME	190 CPI
1	1950- 1	4937.000	2509.000	208.000	53.000	2770.000	18.000	149.000	0.0	1.000	0.721
2	1951- 1	7193.000	2697.000	311.000	191.000	3200.000	18.100	151.000	0.0	2.000	0.778
3	1952- 1	9653.000	2566.000	228.000	333.000	3127.000	18.000	155.300	0.0	3.000	0.795
4	1953- 1	9566.000	2478.000	238.000	350.000	3066.000	18.300	156.500	0.0	4.000	0.801
5	1954- 1	10056.000	2795.000	255.000	400.000	3450.000	18.300	157.200	0.0	5.000	0.805
6	1955- 1	10123.000	3284.000	243.000	434.000	3961.000	20.400	162.100	0.0	6.000	0.802
7	1956- 1	10429.000	3361.000	204.000	396.000	3961.000	21.200	168.600	0.0	7.000	0.814
8	1957- 1	10345.000	3510.000	258.000	451.000	4219.000	20.400	164.800	0.0	8.000	0.843
9	1958- 1	11213.000	3365.000	268.000	475.000	4108.000	20.200	162.400	0.0	9.000	0.666
10	1959- 1	12119.000	4048.000	388.000	566.000	5002.000	19.900	165.100	0.0	10.000	0.873
11	1960- 1	12006.000	3928.000	512.000	516.000	4956.000	20.400	166.800	6808.000	11.000	0.887
12	1961- 1	12472.000	4067.000	380.000	606.000	5053.000	20.400	167.100	6616.000	12.000	0.896
13	1962- 1	12302.000	4092.000	371.000	752.000	5215.000	22.000	171.700	6737.000	13.000	0.906
14	1963- 1	12767.000	4030.000	396.000	793.000	5219.000	22.400	174.600	6729.000	14.000	0.917
15	1964- 1	14362.000	4446.000	480.000	847.000	5773.000	21.500	176.200	7275.000	15.000	0.929
16	1965- 1	15446.000	4767.000	499.000	868.000	6133.000	22.200	181.300	7490.000	16.000	0.945
17	1966- 1	14725.000	4593.000	490.000	846.000	5928.000	23.000	186.700	7292.000	17.000	0.972
18	1967- 1	14464.000	4505.000	397.000	856.000	5757.000	22.400	190.200	7025.000	18.000	1.000
19	1968- 1	15435.000	4504.000	424.000	852.000	5780.000	23.300	194.800	6657.000	19.000	1.042
20	1969- 1	17866.000	5042.000	412.000	891.000	6344.000	24.100	197.700	7668.000	20.000	1.098
21	1970- 1	20183.000	4926.000	378.000	902.000	6206.000	23.900	201.400	7652.000	21.000	1.163
22	1971- 1	20068.000	4901.000	367.000	895.000	6163.000	24.000	207.100	7751.000	22.000	1.213
23	1972- 1	21170.000	5185.000	353.000	884.000	6421.000	24.900	218.100	7952.000	23.000	1.253
24	1973- 1	21623.000	4729.000	414.000	864.000	6006.000	24.400	226.200	7004.000	24.000	1.331
25	1974- 1	20273.000	4504.000	412.000	807.000	5723.000	24.300	235.900	6767.000	25.000	1.477
26	1975- 1	20615.000	0.0	0.0	0.0	0.0	22.200	240.000	0.0	26.000	1.612

	181 MDUTOT	182 GFGRES	183 GFGIND	184 GFGOTH	185 GFGTOT	186 MEMPMA	187 MNONAG	188 TEMP	189 TIME	190 CPI

		191 WPI	192 CPIGAS	193 CPIELE	194 CPIGAS	195 WPIGAS	196 WPIELE	197 MDUPOP	198 MPCPOP	199 POP	200 MELRE
1	1950- 1	0.818	0.731	0.908	0.812	0.0	0.0	155.900	435.200	591.000	0.0
2	1951- 1	0.911	0.727	0.915	0.815	0.0	0.0	160.400	446.700	607.100	0.0
3	1952- 1	0.886	0.741	0.924	0.826	0.0	0.0	171.600	451.800	623.400	0.0
4	1953- 1	0.874	0.764	0.936	0.842	0.0	0.0	174.000	460.300	634.300	0.0
5	1954- 1	0.876	0.779	0.940	0.853	0.0	0.0	168.700	476.600	645.300	0.0
6	1955- 1	0.878	0.810	0.952	0.875	0.0	0.0	174.000	486.100	660.100	0.0
7	1956- 1	0.907	0.823	0.955	0.884	0.0	0.0	175.800	499.300	675.100	0.0
8	1957- 1	0.933	0.837	0.959	0.893	0.0	0.0	177.800	500.100	677.900	0.0
9	1958- 1	0.946	0.886	0.971	0.924	0.761	0.997	189.100	499.000	688.100	0.0
10	1959- 1	0.948	0.916	0.985	0.947	0.829	1.001	189.300	492.000	681.300	0.0
11	1960- 1	0.949	0.977	0.998	0.986	0.872	1.012	192.000	482.800	674.800	2.301
12	1961- 1	0.945	0.990	1.001	0.994	0.887	1.017	195.600	496.700	692.300	2.206
13	1962- 1	0.948	0.989	1.001	0.994	0.892	1.021	201.400	507.700	709.100	2.226
14	1963- 1	0.945	0.990	1.001	0.994	0.918	1.013	202.000	505.100	707.100	2.173
15	1964- 1	0.947	0.993	0.996	0.994	0.907	1.004	202.900	502.200	705.100	2.126
16	1965- 1	0.966	0.996	0.991	0.994	0.928	1.001	200.400	504.800	705.200	2.040
17	1966- 1	0.996	1.002	0.991	0.996	0.967	0.996	196.900	505.200	702.100	2.018
18	1967- 1	1.000	1.000	1.000	1.000	1.000	1.000	196.100	505.000	701.100	1.977
19	1968- 1	1.025	1.010	1.009	1.009	0.927	1.009	187.900	505.300	693.200	1.922
20	1969- 1	1.065	1.028	1.028	1.028	0.933	1.018	185.100	508.700	693.800	2.027
21	1970- 1	1.104	1.085	1.062	1.073	1.030	1.048	190.000	504.400	694.400	2.047
22	1971- 1	1.139	1.162	1.132	1.147	1.080	1.136	193.100	516.300	709.400	2.041
23	1972- 1	1.191	1.223	1.189	1.205	1.141	1.215	193.600	522.500	716.100	2.081
24	1973- 1	1.347	1.279	1.249	1.264	1.267	1.293	197.500	532.300	729.800	2.135
25	1974- 1	1.601	1.439	1.475	1.458	1.622	1.631	201.800	535.200	737.000	2.150
26	1975- 1	1.749	1.725	1.670	1.696	2.167	1.934	204.100	543.400	747.500	0.0

		191 WPI	192 CPIGAS	193 CPIELE	194 CPIGAS	195 WPIGAS	196 WPIELE	197 MDUPOP	198 MPCPOP	199 POP	200 MELRE

APPENDIX 3

Counties in the Natural Gas Consuming Regions in Montana

Eastern Region	Western Region
Big Horn	Beaverhead
Carter	Blaine
Custer	Broadwater
Daniels	Carbon
Dawson	Cascade
Fallon	Chouteau
Garfield	Deer Lodge
McCone	Fergus
Phillips	Flathead
Powder River	Gallatin
Prairie	Glacier
Richland	Golden Valley
Roosevelt	Granite
Rosebud	Hill
Treasure	Jefferson
Valley	Judith Basin
Wibaux	Lake
Yellowstone	Lewis and Clark
	Liberty
	Lincoln
	Madison
	Meagher
	Mineral
	Missoula
	Musselshell
	Park
	Petroleum
	Pondera
	Powell
	Ravalli
	Sanders
	Sheridan
	Silver Bow
	Stillwater
	Sweet Grass
	Teton
	Toole
	Wheatland

APPENDIX 4

ENERGY CONSUMPTION PER CAPITA PROJECTION EQUATIONS

Total Energy Consumption
Per Capita
Montana
(million BTUs/person)

Equation	Period	N	Constant	Time	$\overline{HDD}$	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	.13	.0059 (10.83)	.00001 (1.91)				.93	1.67
B	1960- 1974	15	.19	.0064 (12.03)					.91	1.62

Household/Commercial Energy
Consumption Per Capita
Montana
(million BTUs/person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	.06	.0008 (4.16)	.00001 (2.47)				.74	1.71
B	1960- 1974	15	.09	.0011 (5.06)					.64	1.35

Industrial Energy Consumption
Per Capita
Montana
(million BTUs/person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	.0004	.0030 (6.56)	.00001 (1.32)				.82	1.50
B	1960- 1974	15	.0380	.0033 (7.87)					.81	1.51

Total Electricity Consumption
Per Capita
Montana
(thousand kwhr / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	-11.83	.1402 (1.13)	.0015 (3.27)			53.0220 (3.19)	.94	1.33
B	1960- 1974	15	-13.20		.0016 (3.47)			70.4820 (11.40)	.94	1.68
C	1960- 1974	15	.84	.5775 (9.10)					.85	.83
D	1960- 1974	15	- 3.75					79.8495 (10.56)	.89	1.08
E	1960- 1974	15	- 2.48	.2086 (1.27)				53.1163 (2.38)	.89	.88
F	1967- 1974	8	-13.40		.0019 (3.67)			58.8933 (3.47)	.74	1.98
G	1967- 1974	8	- 4.49	.2863 (1.89)	.0016 (2.17)				.49	1.43
H	1967- 1974	8	6.94	.3032 (1.57)					.17	1.09
I	1967- 1974	8	2.77					49.9283 (1.69)	.21	.70

Household / Commercial Electricity
Consumption Per Capita
Montana
(thousand kwhr / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	- 2.41		.0002 (1.64)			36.1746 (18.15)	.97	1.14
B	1960- 1974	15	.08	.2071 (45.89)					.99	.87
C	1960- 1974	15	- 1.33					37.5021 (19.36)	.96	1.17
D	1967- 1974	8	4.03		.0002 (4.96)	.0612 (5.13)	-3.3385 (-23.80)		.99	2.93
E	1967- 1974	8	1.50	.0884 (1.23)	.0001 (2.41)	.0435 (2.38)	-1.9315 (- 1.68)		.99	3.14
F	1967- 1974	8	- 1.88	.0929 (1.86)	.0002 (1.21)			20.1952 (1.44)	.98	2.69
G	1967- 1974	8	- 3.23		.0003 (5.71)			36.9974 (20.77)	.98	3.22
H	1967- 1974	8	- .22	.2029 (19.67)	.00005 (1.11)				.98	2.06
I	1967- 1974	8	.17	.2035 (19.37)					.98	1.49
J	1967- 1974	8	- .93					35.2798 (8.02)	.90	1.17
K	1967- 1974	8	- 3.23		.0003 (5.71)			36.9974 (20.77)	.98	3.22

Industrial Electricity Consumtpion
Per Capita
Montana
(thousand kwhr / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	-13.94		.0021 (3.73)			23.7981 (4.83)	.77	1.30
B	1960- 1974	15	- 8.44	.3090 (5.27)	.0014 (2.45)				.72	.88
C	1960- 1974	15	- .06					28.6655 (4.28)	.55	.74
D	1967- 1974	8	- 7.95		.0018 (2.64)			11.0057 (1.29)	.42	1.36
E	1967- 1974	8	- 4.29	.0920 (1.61)	.0015 (2.07)				.28	1.45

Total Natural Gas Consumption
Per Capita
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	-27.40	2.4162 (13.05)	.0110 (6.00)				.96	2.14
B	1960- 1974	15	42.03	2.9282 (9.30)					.86	.95
C	1967- 1974	8	-19.31	2.1016 (3.45)	.0108 (3.63)				.78	2.28
D	1967- 1974	8	57.53	2.2152 (2.09)					.32	.86

Household / Commercial Natural Gas
Consumption Per Captia
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\overline{R}^2$	D.W.
A	1960- 1974	15	- 2.06	.8731 (4.20)	.0051 (7.08)				.89	1.16
B	1960- 1974	15	30.42	1.1126 (6.73)					.76	.86
C	1967- 1974	8	17.88	.2801 (1.27)	.0042 (3.89)				.70	2.45
D	1967- 1974	8	67.42	2.9900 (2.33)				-494.8800 (-2.15)	.34	1.55

Industrial Natural Gas
Consumption Per Capita
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	-27.30	1.4083 (10.12)	.0059 (4.32)				.93	2.05
B	1960- 1974	15	10.34	1.6859 (8.90)					.85	1.10
C	1960- 1974	15	14.09	2.1902 (6.01)				-49.8625 (-1.59)	.86	1.32
D	1967- 1974	8	-38.35	1.6471 (3.67)	.0067 (3.07)				.76	2.00
E	1967- 1974	8	9.46	1.7178 (2.47)					.42	.86
F	1967- 1974	8	14.27	2.3738 (2.87)				-64.3429 (- 1.31)	.48	1.30

Total Natural Gas Consumption
Per Capita
Eastern Region
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	- 2.57	.2164 (2.18)					.21	1.16
B	1967- 1974	8	-13.60	.7225 (2.64)					.46	2.13

Total Natural Gas Consumption
Per Capita
Western Region
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\overline{R}^2$	D.W.
A	1960- 1974	15	.21	.0727 (3.83)	.0004 (2.19)				.70	.59
B	1960- 1974	15	2.83	.0920 (4.80)					.61	.34
C	1967- 1974	8	2.93		.0001 (1.01)			- 2.4372 (- 1.34)	.16	1.88
D	1967- 1974	8	3.53					- 2.7141 (- 1.51)	.15	1.43

Household / Commercial Natural Gas
Consumption Per Capita
Eastern Region
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	- 9.95	1.0670 (5.86)	.0062 (3.44)				.85	1.02
B	1960- 1974	15	29.27	1.3563 (6.20)					.73	.91
C	1967- 1974	8	15.72	.1690 (1.51)	.0054 (3.38)				.58	2.02

Household / Commercial Natural Gas
Consumption Per Capita
Western Region
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	16.04	1.6692 (3.89)	.0034 (2.91)			-180.4286 (- 2.07)	.92	1.61
B	1960- 1974	15	.72	.8046 (7.43)	.0047 (4.43)				.90	1.39
C	1960- 1974	15	30.75	1.0261 (6.86)					.77	.89
D	1960- 1974	15	42.78	2.4729 (5.90)				-326.0323 (- 3.57)	.88	1.25
E	1967- 1974	8	13.13	.4472 (2.47)	.0026 (2.94)				.66	2.71
F	1967- 1974	8	-23.71	2.5904 (2.87)		-.6220 (-.91)	29.4064 (2.91)		.69	2.20
G	1967- 1974	8	31.37	.4745 (1.74)					.22	.97
H	1967- 1974	8	33.51	2.0142 (5.66)				-267.5648 (- 4.64)	.82	2.27

Industrial Natural Gas Consumption
Per Capita
Eastern Region
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1960- 1974	15	-46.13	2.1040 (6.61)	.0051 (1.63)				.83	.91
B	1960- 1974	15	-13.53	2.3440 (7.82)					.81	.81
C	1960- 1974	15	10.07	2.8696 (7.14)				-144.3453 (- 1.80)	.84	.87
D	1967- 1974	8	-96.11	3.2454 (2.64)	.0086 (4.87)				.81	2.30
E	1967- 1974	8	-34.97	3.3358 (3.56)					.62	.83
F	1967- 1974	8	3.97	3.2627 (3.51)				-152.4941 (- 1.08)	.63	.94

Industrial Natural Gas Consumption
Per Capita
Western Region
Montana
(thousand mcf / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	$\bar{R}^2$	D.W.
A	1967- 1974	8	-17.52	1.0458 (2.77)	.0061 (3.28)				.71	1.91
B	1967- 1974	8	25.39	1.1092 (1.82)					.25	.97
C	1967- 1974	8	26.95	1.6554 (2.41)				-44.9502 (- 1.40)	.35	1.47

Petroleum Consumption
Per Capita
Montana
(thousand barrels / person)

Equation	Period	N	Constant	Time	HDD	GP	EP	GP/EP	R	D.W.
A	1960- 1974	15	18.95	.5155 (6.41)					.74	1.00
B	1967- 1974	8	7.36	1.0422 (10.89)					.94	1.98

IV
Montana Alternative Simulation System

INTRODUCTION

The Montana Alternative Simulation System (MASS) is a computerized data file and model designed to serve as a quantitative tool in the appraisal of the economic and demographic impact of a wide range of exogenous events. MASS combines trend, economic base analysis and a cohort-survival process into a complementary whole, thus avoiding the divergent forecasts of employment and population that commonly result from independent forecasting methods. The main goal in the development of the system was to produce a consistent set of county level employment and population projections as well as to provide a general framework for evaluating the impacts of industrial developments. The main advantage of MASS lies in its ability to produce at low cost, in both time and resources, projections of the impact of economic events. However, as with any model or information source, the outputs of MASS must be considered only a part of the analysis rather than an end product. Far too often, models tend to become crutches rather than being used as a decision making aid.

THE ALTERNATIVE FUTURES APPROACH

Over the last few years interest in empirical analysis at the regional level has grown sharply. Interest in this area was in all likelihood triggered by the inability of traditional techniques to project the impacts of events which represent significant shifts from past trends such as energy development in rural areas. Such developments can create dramatic changes in the employment and demographic levels and composition of the impacted areas. The first and foremost prerequisite of sound planning is a reliable estimate or projection of the population and employment impact of the development. Aside from the revenue aspects of the development, most facets of planning are directly tied to county specific population levels which are in turn contingent upon anticipated employment. For those states which have experienced

rapid change, the emphasis has shifted away from point estimates to sets of estimates based upon a set of alternative scenarios or futures; hence the term, alternative futures approach. The MASS system falls into the general category of the alternative futures approach. However, it should be remembered that the advantages of the alternative futures approach depend on the reliability of the scenarios. For similar reasons, the usefulness of such models is contingent upon being able to attach at least a subjective probability to each scenario. In short, while the procedure has a simulation orientation, the desired result from a policy or planning position stills remains a forecast.

FACTORS INFLUENCING THE STRUCTURE OF MASS

Throughout the development of MASS every attempt was made to satisfy the following criteria: The model must

1) Be capable of providing estimates of county specific basic service ratios over time.
2) Incorporate the effects of changing participation rates within the labor force.
3) Be capable of discriminating between the population effects of a change in basic employment versus in non-basic employment.
4) Be constructed at the most detailed spatial level possible for use by planners.
5) Include revelant non-basic linkages between regions.
6) Allow employment and population levels to be internally consistent with state level projections.
7) Provide projections of either county or state level basic employment activity that incorporate all known information sources.

A GENERAL OBSERVATION ON MODEL DESIGN

The first stage in the construction of MASS involved the basic-non-basic categorization of twenty-five employment sectors for each of fifty-six counties. County level detail was necessary to provide planners with the most disaggregated information possible. Income data was not included in the model due to the volatile nature of farm income estimates. A careful review of cross sectional and time series income data indicated that the variations made limited *a priori* sense. The combination of farm inventory fluctuations, cost estimating procedures, and miscellaneous imputations renders rural income estimates virtually useless.

Employment sectors were classified as basic or non-basic (or some combination) in a careful but yet subjective fashion. All available information sources were employed in this process. For example, regional tourism estimates were used to extract the basic components of this sector from the non-basic. Administrative records were employed to determine excessively high concentrations of state government employment in certain counties. Similarly, the employment associated with large-scale construction projects (dams, highways, etc.) was assumed to be basic activity. State and national location quotients were frequently utilized as an aid, but the final determination was based primarily on a familiarity with the region. Given these basic-non-basic distinctions, county level employment multipliers were then calculated.

The multipliers generated during the first phase of the project were later used as a basis for calculating the employment impact of a change in basic activity. However, as the reader will recall, one of the criteria mentioned earlier related to the need for variable multipliers over time. On the basis of regression analysis of national and state data, the principal cause of the rapid change in basic/service ratios appears to have been to a large degree

the result of demographic and participation rate changes, i.e., the result of the "baby boom" phenomenon and increased female participation in the labor force. Consequently, projected multipliers at the state level were calculated as a direct but non-linear function of expected employment-population ratios generated by a one year age, sex specific cohort model employing BLS participation rate projections. The state level movements in basic/service ratios were assumed to hold at the county level. Assuming that this method actually captures the real determinants of change in the basic/services ratios, the projected values indicate that future basic/service ratios will be reasonably stable, increasing slightly for the next ten years then gradually tapering off to approximately the present level.

Several alternatives to the current procedure were examined and are discussed briefly below. Since the ratios have changed significantly over the last ten years, it would be somewhat reckless to assume that they would change as much in the future, in light of the demographic and participation rate variables mentioned earlier. If basic and non-basic employment levels were adjusted for full time equivalents, extrapolation would be much safer but still not account for demographic composition nor expected participation rate changes. The extrapolation of adjusted data would in all probability still overstate future growth in the multipliers. On the other hand, a fixed multiplier would not be acceptable either. The fixed multiplier problem was the primary reason why input/output techniques were not used. Simply stated, fixed coefficients are not capable of incorporating changes in basic/service ratios or productivity. Secondly, I/O tables constructed at the state level are not suitable for use at the local level where linkages are different, i.e., within a more open economy. Thirdly, I/O tables are generally expressed in terms of income -- a problem which was discussed earlier. And lastly, I/O techniques were not

employed since primary energy sector I/O data showed extreme variability.

Admittedly, basic/service multipliers vary from industry to industry, a phenomenon which can be analyzed only within an I/O context. However, a review of primary tables transformed (endogenous households) into employment terms indicated that the overall impact of different basic sectors did not show significant variation at the state level.

It is not meant to suggest that the current moving basic/service ratio approach is without fault, but only that it may be somewhat more realistic than a reliance on fixed ratios, I/O analysis, or extrapolated multipliers. However, one major problem induced by this technique is the need to determine county-to-county linkages. At the county level impacts are often times felt accross county lines.

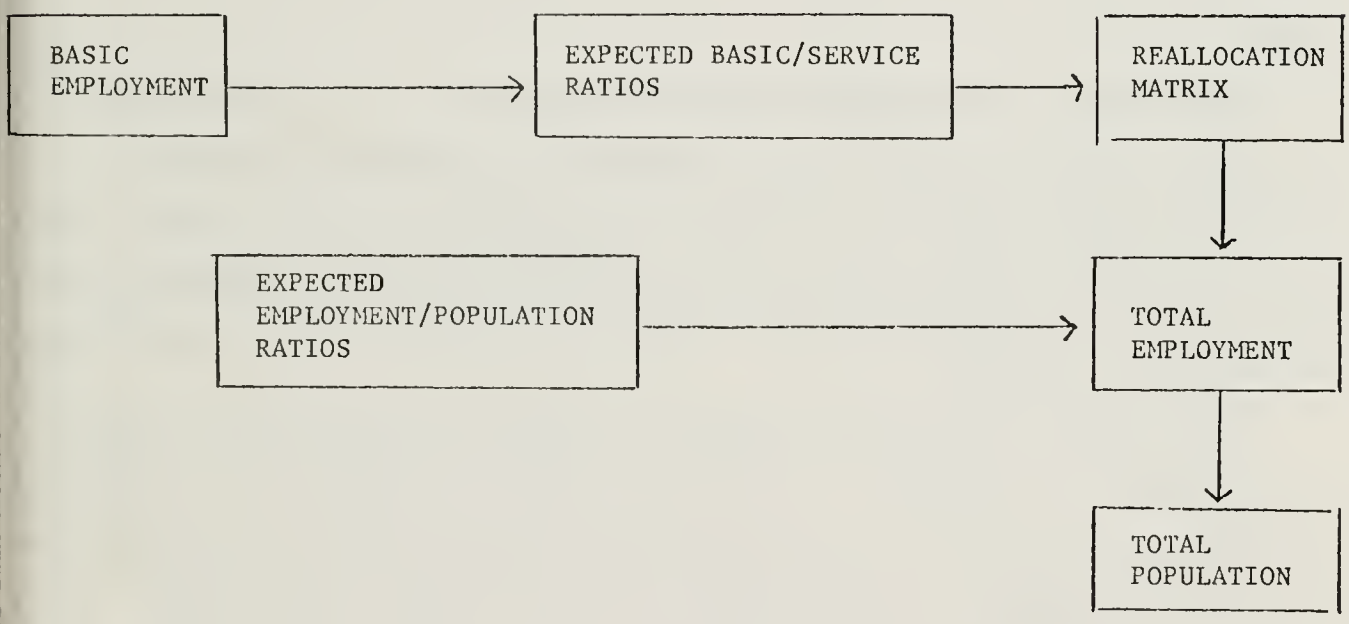
To discuss this issue further, it might be instructive to review again how the basic/service ratios were established. The projected multipliers at both the state and county level were expressed as a function of the labor force cohort model. When the state level multiplier exceeds the local multipler, the difference is reallocated to other areas using a linear programming gravity type model. This procedure was used to solve for the county level non-basic network so that the county level impacts would sum to the state level. Either heuristic, gravity, or optimization methods would have produced essentially the same result, i.e., a trade network based on historical market center development.

The next major link in the system required the development of a set of projected population multipliers. These employment/population multipliers were produced using the cohort model, and BLS participation rate projections. It is particularly important that these ratios be allowed to move over time

for the same reasons which contributed to the growth in basic/service ratios, i.e., part-time jobs, female participation rates, and demographic changes. Once again an extrapolation of historical trends could produce perverse results. Additionally, the procedure allows for the fact that a change in employment in the basic or non-basic sectors has a significantly different population effect. That is, one new basic worker has a far greater population effect than one new non-basic worker. Both time series and cross sectional regression analysis indicated that the ratios were roughly three to one, and one to one respectively. The aggregate ratio approach, in some respects remedies this problem.

THE SPECIFIC STRUCTURE OF MASS

The specific structure of MASS is depicted in the following diagram.



NOTE: The reallocation matrix is used only for impact analysis, i.e., bypassed in the baseline runs

A change in basic employment activity is converted into a change in non-basic activity through the moving basic/service ratio yielding total expected employment which is in term converted into a total population level. The logic is the same for both baseline and scenario analysis.

Baseline projections of basic employment levels in effect drive the entire system. These projections are first made at the state level and then allocated to the substate level. Industry-by-industry projections were made on the basis of all information sources including shift-share, time trends, national projections, and interviews with major industries. Although the projections were based on a mix of information sources, it is our opinion that such a "subjective process" is far more appropriate than a strict reliance on long term regression models.

SUMMARY

MASS attempts to incorporate changing basic/service ratios and population mulitpliers making the system somewhat dynamic over time while allowing for county-to-county linkages. In addition to the employment based population projections, a cohort model is also included to project population under varying migration assumptions.

The system is presently in operation and producing plausible projections for employment and population. The model is structured in such a way that it can be easily updated when new information becomes available. We feel that when reasonable discretion is exercised, the system is quite valuable for what it was intended to do -- produce consistent employment and population projections while forcing the analyst to think in the process.

V
Statewide Cooperative Land Use Mapping Program

Project Summary

I. Background

In June of 1975, Governor Thomas L. Judge issued Executive Order 6-75 which designated the Montana Department of Community Affairs as the state land use planning agency and charged the department with "...developing and maintaining a centralized information center containing the physical...data required by the land use planning process at the state and local level, and initiating ...interagency and intergovernmental discussion and cooperation concerning land use planning and the attainment of common goals."

In response to both the Governor's directive and a long recognized need for statewide land use information in a uniform format, this department has designed and proposed an intergovernmental, interagency land use mapping program. Several state and federal agencies were contacted during the early stages of developing the proposal. Their support and interest in the concept of cooperative land use mapping led to the creation of an ad-hoc committee which subsequently agreed to such essentials as a standard map scale and the various classifications of land use to be mapped.

The cooperative mapping project is now ready to proceed. Important commitments of services, financial support and cooperation have been made by the participating state and federal agencies. The program, as developed to date, reflects a unique level of cooperation between agencies of the state and federal governments.

Its successful completion will produce a product of substantial value to all participants and the general public.

II. Project Justification

Natural resource and planning agencies at all levels of government have, during the past few years, experienced unprecedented needs for basic land use information. Widespread concern for a quality environment coupled with expanding urban areas and mounting pressures to accelerate the development of our natural resources have served to highlight the need for rational planning and management of the use of land. There are few, if any, planning tools more essential for conceptual purposes and technical applications than reasonably accurate, comprehensive land use maps.

Special purpose land use information is presently compiled and maintained by many public and private agencies. Such information is, often of necessity, kept by a wide variety of agencies in various statistical and graphic forms. There is, however, no single source of comprehensive, statewide land use information, mapped at a uniform scale that is available on a county by county basis.

Participating agencies in this cooperative program have expressed their own particular needs for a comprehensive inventory and mapping of land uses. All have stated a general need for a baseline inventory which can be used for locating and analyzing specific land management problems, for short and long range planning purposes and as a basis for future monitoring of land use changes.

III. Agency Responsibilities

Without question, the success of the cooperative mapping program

will depend on the dedication of all agencies to their individual tasks of supplying their best available information and services in a timely fashion. To the best of our ability, each task has been thoroughly discussed with the responsible agency and the feasibility of the task has been determined. Coordination and cooperation is a joint responsibility which must be shared by all participants.

All of the nine participating agencies have responsibilities that are essential to the successful completion of the program:

1) Montana Department of Community Affairs (DCA). The Planning Division will map the urban and built-up and rural and suburban tracts information. In addition, the Division will be responsible for assembling land use information from all participants and drafting the preliminary county maps prior to final cartographic preparation. This Division will also be responsible for overall coordination and quality control. Contact person for DCA will be John Andrews.

2) Montana Department of Fish and Game (DF&G). The Recreation and Parks Division will map the private, state and federally-owned recreation areas for the recreational use areas category. Contact person for DF&G will be Dave Conklin.

3) Montana Department of Health and Environmental Sciences (DHES). The Air and Water Quality Bureaus will supply information for mapping the location of industries and utilities requiring a state operating permit. Contact person for DHES will be Carlene Farmer.

4) Montana Department of Highway (DOH). DOH will supply the

½ inch to the mile county base maps which will be used for field mapping. Contact person for DOH will be Paul Devine.

5) Montana Department of Natural Resources and Conservation (DNR&C). The Cartographic Bureau will map the irrigated cropland, hayland and pasture land information. The Bureau will complete the drafting of all land use maps, provide negatives for final map printing, store all cartographic work, and supply negatives to participating agencies upon request. Contact person for DNR&C will be Jack Acord.

6) Montana Department of State Lands (DSL). The Reclamation Division will map the mineral extraction information for mining operations requiring a state operating permit. Contact person for the DSL will be C. C. McCall.

7) United States Bureau of Land Management (BLM). The BLM will make available the data necessary for mapping the rangeland; recreation uses areas; commercial forest areas; and forest cover areas information on land under its administration. Contact person for BLM will be Jim Binando.

8) United States Forest Service (USFS). USFS will map the rangeland; recreation use areas; commercial forest areas; and forest cover areas information for land under its administration. Contact person for the USFS will be Tom Nygren.

9) United States Soil Conservation Service (SCS). The SCS will map the non-irrigated cropland and rangeland information. They will also print those maps completed through October of this year, and will complete the printing of the remaining counties

in the ensuing fiscal year barring any unforseen cuts in their cartographic fund. Contact person for the SCS will be Wendell Thacker.

IV. Land Use Catogories and Data Sources

The following is a list of the land use categories agreed upon by the nine participating agencies, with the major data sources for each category.

Land Use Cateogry

1. Urban and Built-up Areas - includes those lands developed for commercial, industrial (all industrial uses not included in Heavy Industry and Utilities), high-density residential, and associated uses. Included are all lands within the municipal boundaries of incorporated cities and towns and those lands in unincorporated areas devoted to commercial and light industrial uses or where residential structures or parcels occur at an intensity of at least one per two acres.

Data Source: City and County Planning Boards, DCA, DOH

2. Heavy Industry and Utility Areas - includes major feed lots, wood, chemical and mineral processing plants requiring a permit from DHES. Those uses occupying less than 40 acres are represented by point symbols.

Data Source: DHES, DNR&C

3. Rural and Suburban Tracts - includes areas of land divided

into parcels more than two acres but not larger than quarter-quarter aliquot parts of sections (approximately 40 acres). "Divided into parcels" means those parcels created by certificate of survey, subdivision plat, deed, a contract for deed, or other instrument of conveyance.

Data Source: County Clerk and Recorder offices, County Land Classification offices, DCA

4. Mineral Extraction Areas - includes any operating strip or open cut mining and subsurface mining areas, gravel pits and quarries, tailing and waste areas which require a state operating permit. Point symbols are used for areas under 40 acres where individual mines or gravel pits are shown.

Data Source: BLM, DSL, Montana Bureau of Mines

5. Irrigated Cropland, Hayland and Pastureland - includes land used for the production of vegetables, row crops, grain, and hay using subsurface, flood or sprinkler irrigation.

Data Source: DNR&C, SCS

6. Non-Irrigated Cropland - includes all cultivated agricultural land not using irrigation. Land usually used for cultivation, but occasionally used for grazing is classified as non-irrigated cropland. Land which is planted and mowed for hay at regular intervals as well as orchards and Christmas tree plantations are included.

Data Source: ASCS, SCS

7. Recreation Use Areas - includes areas on both public and

private lands used primarily for recreation. Ski areas, parks, campgrounds, regularly used trails, and general recreation areas, with or without support facilities are included. Recreation areas smaller than 40 acres are shown as point symbols.

Data Source: BLM, City and County Planning Boards, DF&G, USFS

8. Rangeland - includes native and introduced grassland or shrubland of less than 15% tree cover as well as eroded areas, steep rocky slopes, barren areas above timberline, and rock outcrops. This includes areas supporting both livestock and foraging wildlife and areas of little value to man because of their unproductive surface conditions.

Data Source: BLM, DCA, USFS

9. Commercial Forest - includes areas managed for timber harvest. Clear cut areas and those in various stages of managed growth, are included. Tree stands actively being harvested and those that may be harvested are mapped. The timber management activities in these areas include roadbuilding, thinning, slash disposal, tree planting, timber cutting, and cull tree removal. Only commerical forest areas on public land are shown.

Data Source: BLM, DCA, DNR&C, USFS

10. Forest Cover Areas - includes both coniferous and decideous tree areas displaying a natural tree canopy or crown cover of 15%

or more. This category includes forested areas unsuitable for commercial harvest or those that fall within management areas that preclude harvest.

Data Source: BLM, DCA, USFS, USGS

V. Work Product

Base maps at a scale of ½ inch to the mile are presently being used by the DOH, DNR&C, BLM, SCS, and USFS. This scale will also be used for the cooperative land use mapping program in order to make the new information compatible with existing data. The final product will be land use maps of each county, which depict the ten land u categories by means of both colors and patterns. Because of the scale being used the minimum land area depicted will be 40 acres. High-impact use areas involving sites for mining, industry and developed recreation will be represented by point symbols. Each county will require from one to six individual maps for total coverage, depending upon county size. Approximately 300 copies of each map will be printed.

VI. Program Funding and Work Schedule

Program funding will be provided by the Montana Departments of Health and Community Affairs. Each will commit $25,000 which will be used to purchase the supplies required by the Cartographic Bureau of the DNR&C and to cover the costs incurred by the DCA in coordinating the program and preparing the initial draft maps.

Cartographic costs	$ 33,000
DCA coordination costs	17,000
Total	$ 50,000

Because much of the impetus for development of the mapping program and a substantial portion of program funding have been provided by the DHES, the program will be tailored to the Department's mapping needs for the Statewide "208" Water Quality Planning Project currently in progress. The Department has requested that fourteen priority counties be completed by October of 1977. These priority counties are: Blaine, Cascade, Deer Lodge, Granite, Hill, Lewis and Clark, Mineral, Missoula, Phillips, Powell, Ravalli, Siver Bow, Teton, and Valley.

Pilot Project: Lewis and Clark County

Prior to beginning a full scale land use inventory of each county in the state, a single county representing a variety of land use information was chosen to test the project design. Because of its topographic diversity, variety of land ownerships, and expanding urban use Lewis and Clark County provided a representative county for testing this mapping effort.

All agencies that will be involved in the cooperative mapping program were provided highway base maps for Lewis and Clark County. Each mapped the land use information each will be contributing to the program. As mapping coordinator, the Planning Division received the separate field maps from each agency and transferred that information on to a single set of ½ inch to the mile base maps for the pilot county. Each of the ten land use categories were color coded and no land use was shown on the map that was smaller than 40 acres in size.

As expected, the boundary between the Forest Service and private lands presented a problem in matching land use boundaries, particularly Forest Cover and Rangeland. This has been resolved by gaining a better understanding of their land use classification system.

The resulting map displays all ten land use categories the program is delineating and provides essential and useful information for

any agency with planning or natural resource management responsibilities.

In analyzing the land use patterns which resulted from mapping the pilot county, several relationships between different land uses were apparent. The location and extent of subdivided land provides invaluable information on the conflicts between existing and potential residential use areas and loss of irrigated and dry cropland areas to these uses. This is evident in the Helena Vally where much of the agricultural land is being converted into residential use. As the result of the subdivision of an isolated land tract along Wolf Creek north of the Valley, a number of large adjacent land parcels are being subdivided. The location of these potential residential areas is essential in analyzing the economic impacts of agricultural land loss and its change to residential and recreational use and the increased use of adjacent transportation routes as a result of residential activity. Additionally, the extent and location of commercial forest on public lands, even though only a small portion of that area is being harvested at one time, provides an insight into the long-range economic resources of the area. Existing timber products production can also be linked to the number of sawmills also shown on the map.

The analytical value of these maps go far beyond the brief description in the preceding paragraph. Statewide coverage will provide baseline data from which to measure these and other land use changes.

This map and others to follow, will be duplicated; one will be given

to the Department of Health for their use in analyzing water quality problems as part of their 208 Water Quality program responsibilities. The other will be given to the Department of Natural Resources for cartographic drafting in preparation for final map printing by the S.C.S.

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